Issued March 2, 1908.

U. S. DEPARTMENT OF AGRICULTURE,

FOREST SERVICE—BULLETIN 77.

GIFFORD PINCHOT, Forester.

(IN COOPERATION WITH THE DEPARTMENT OF COMMERCE AND LABOR, BUREAU OF THE CENSUS, S. N. D. NORTH, DIRECTOR.)

FOREST PRODUCTS OF THE UNITED STATES: 1906.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1908.

LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
FOREST SERVICE,
Washington, D. C., January 20, 1908.

SIR: I have the honor to transmit herewith a manuscript entitled "Forest Products of the United States: 1906," and to recommend its publication as Bulletin 77 of the Forest Service.

Previous to 1905, statistics upon the production of lumber and timber products were collected by the Bureau of the Census in connection with the decennial and quinquennial censuses of manufactures. To satisfy the urgent demand for more frequent reports upon these important products, the Forest Service collected statistics of the production in 1905. In order to avoid duplication of work and to insure uniformity of results, the Bureau of the Census and the Forest Service arranged in 1906 to cooperate in the preparation of annual statistics of forest products.

The collection and compilation of the statistics of production in 1906, therefore, have been under the direct supervision of W. M. Steuart, Chief Statistician for Manufactures, and J. E. Whelchel, Expert Chief of Division, on the part of the Bureau of the Census; and R. S. Kellogg, Chief of the Office of Wood Utilization, and H. M. Hale, Forest Assistant, on the part of the Forest Service.

Respectfully,

GIFFORD PINCHOT,
Forester.

Hon. JAMES WILSON,
Secretary of Agriculture.

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FOREST PRODUCTS OF THE UNITED STATES: 1906.

INTRODUCTION.

The output of forest products in the United States in 1906 was the largest ever recorded, and the values averaged higher than at any previous time. This does not necessarily mean, however, that the production of that year was in excess of any previous year, since, until recently, annual statistics of this character have not been collected, and there may have been years for which no statistics are available for which the cut exceeded that in 1906. All things considered, however, it is fairly probable that the year 1906 marked the maximum cut of forest products in the United States, and that the quantity manufactured in that year will not be exceeded in later years. An estimate of the quantity and value of these products is given in the following table:

Annual output of forest products.

[Value estimated at point of production.]

	Quantity.	Value.
Lumber.....feet B. M..	40,000,000,000	$650,000,000
Firewood.....cords..	100,000,000	350,000,000
Shingles and lath.....	.....	37,000,000
Hewed cross-ties.....number..	78,000,000	35,000,000
Cooperage stock.....	.....	32,000,000
Gum turpentine and rosin.....	.....	25,000,000
Pulpwood.....cords..	3,000,000	15,000,000
Tanbark and extract.....	.....	10,500,000
Telephone and telegraph poles.....number..	4,000,000	9,000,000
Round mine timbers.....cubic feet..	170,000,000	7,500,000
Timber exported (unsawed).....	.....	5,000,000
Wood used for distillation.....cords..	1,200,000	3,500,000
Wood used for veneer.....feet B. M..	350,000,000	3,000,000
Maple sugar and sirup.....	.....	2,500,000
Posts, piles, and other products.....	.....	15,000,000
Total.....	.....	1,200,000,000

These figures are, in the main, based upon reports to the Bureau of the Census and the Forest Service and with one exception may be accepted as conservative statements of the exploitation of our forests. The only item concerning which there is much uncertainty is that of firewood, which is estimated to amount to 100,000,000 cords, with a value at the point of production of $350,000,000. Very little data

have ever been collected upon the consumption of firewood. The census of 1880 estimated the annual use at that time at 146,000,000 cords. There has unquestionably been a relative decrease in the use of wood for fuel since 1880, but the increase in population and in manufacturing industries has been so great that it seems probable that the present annual consumption of firewood is at least 100,000,000 cords.

The total quantity of wood which it was necessary to cut in the forests in order to obtain the products listed was probably not less than 20 billion cubic feet. As is well known, there is a large amount of waste in the conversion of a tree into lumber, shingles, ties, and other products. It is conservatively estimated that on the whole less than 50 per cent of a tree finally goes into merchantable form under present conditions of forest utilization. The manufacturers of the more valuable woods reduce the percentage of waste through the use of finer saws and other means of economy, but even with these methods a large amount of waste must necessarily arise. The utilization of this waste is one of the most important problems now before the manufacturer. It is perhaps not too much to anticipate that some day nearly all of the waste which can not be worked into other forms will be utilized by chemical means, the most promising ones at present being distillation and the manufacture of pulp. Many problems must yet be solved, however, before such a utilization will be profitable.

THE LUMBER CUT OF THE UNITED STATES IN 1906.

The data given in this circular are based upon reports from 22,398 lumber manufacturers, representing all parts of the United States. A large proportion of the reports were received directly from the manufacturers on a schedule prepared by the Bureau of the Census and the Forest Service. In addition, the Northern Pine Manufacturers Association, the Yellow Pine Manufacturers Association, the North Carolina Pine Manufacturers Association, the Western Pine Manufacturers Association, the Southern Cypress Manufacturers Association, and the Pacific Coast Lumber Manufacturers Association rendered efficient help in securing reports from negligent manufacturers. All the data for New York were furnished by the Forest, Fish, and Game Commission of that State, which made an especially close canvass, with the result that a statement of the output of practically every mill in the State was secured.

No claim is made that the figures here presented are absolutely correct for the quantity and value of the lumber output of the various States in 1906, but they are close approximations. There are a large number of small and portable sawmills throughout the country which were not reached, but the influence of their combined output upon the total is relatively slight, as is well shown by a comparison of the reports from New York in 1905 and in 1906. The Forest, Fish, and Game Commission obtained reports from 1,167 mills in that State in 1905, and from 2,488 mills in 1906, an increase of 113 per cent in the number of reports; but the total quantity of lumber reported in 1906 was but 8 per cent greater than that in 1905.

The reported lumber production of the United States in 1906 was 37,550,736,000 feet, with a mill value of $621,151,388, the largest quantity ever reported for a single year, and by far the greatest value. In addition there were produced 11,858,260,000 shingles, valued at $24,154,555, and 3,812,807,000 lath, valued at $11,490,570. The total value of the lumber, lath, and shingle production reported in 1906 was thus $656,796,513. Making a fair allowance for incomplete reports, it is safe to say that at present the annual lumber cut of the United States approximates 40 billion feet, and that the total mill value of the lumber, lath, and shingles annually produced is not less than $700,000,000.

In the following pages are given details of the production of lumber, lath, and shingles by States and by species, and comparisons with Census statistics for 1899 and 1904 (based upon the censuses of 1900 and 1905). No detailed reports were received from Alaska. It is known, however, that the cut of Alaskan mills in 1906 approximated 16 million feet, of which some 15 million was spruce and the rest mainly cedar.

SUMMARY OF LUMBER PRODUCTION.

Table 1 gives the lumber production of the United States by leading species in 1899, 1904, and 1906. The apparent slight decrease in the production of 1904 over that of 1899 is due to a difference in the method of taking the two censuses, and not to an actual diminution of the output. In 1899 reports were received from both merchant and custom mills, but in 1904 the census was restricted to the former. In 1906 figures were sought once more from both kinds. The statistics for 1904, then, are not strictly comparable with the others. In 1899 the whole number reported was 31,833, of which probably about 23,500 were merchant mills; in 1904 the number was 19,127; in 1906, 22,396. For a number of years the tendency has been toward a reduction in the number of lumber mills, with an accompanying increase in the output of each remaining establishment. The decrease in the number of mills on account of the lessening timber supply in some localities is hardly counterbalanced by the new plants set up in other regions.

TABLE 1.—*Comparison of lumber production of leading species, 1899, 1904, 1906.*

Kind.	1899	1904	1906	Per cent increase (+) or decrease (−) since 1899.
	M feet.	*M feet.*	*M feet.*	
Yellow pine	9,658,923	11,533,070	**11,661,077**	+ 20.7
Douglas fir	1,736,507	2,928,409	**4,969,843**	+186.2
White pine[a]	7,742,391	5,332,704	**4,583,727**	− 40.8
Hemlock	3,420,673	3,268,787	**3,537,329**	+ 3.4
Oak	4,438,027	2,902,855	**2,820,393**	− 36.4
Spruce	1,448,091	1,303,886	**1,644,987**	+ 13.6
Western pine	944,185	1,279,237	**1,386,777**	+ 46.9
Maple	633,466	587,558	**882,878**	+ 39.4
Cypress	495,836	749,592	**839,276**	+ 69.3
Poplar	1,115,242	853,554	**683,132**	− 38.7
Redwood	360,167	519,267	**659,678**	+ 83.2
Red gum	285,417	523,990	**453,678**	+ 59.0
Chestnut	206,688	243,537	**407,379**	+ 97.1
Basswood	308,069	228,041	**376,838**	+ 22.3
Birch	132,601	224,009	**370,432**	+179.3
Cedar	232,978	223,035	**357,845**	+ 53.7
Beech	(*b*)	(*b*)	**275,661**	.....
Cottonwood	415,124	321,574	**263,996**	− 36.4
Elm	456,731	258,330	**224,795**	− 50.8
Ash	269,120	169,178	**214,460**	− 20.3
All others	486,848	684,526	**936,555**	+ 92.4
Total	34,787,084	34,135,139	**37,550,736**	+ 7.9

[a] Includes Norway pine.

[b] Not separately reported.

Since 1899, the first year for which detailed figures upon the cut of the individual species are available, there have been decided changes in the rank of most of the important lumber-producing species. The total cut of softwood lumber in 1899 was 26,153,063,000 feet, and of hardwood, 8,634,021,000 feet. In 1906 the softwood cut was 30,235,245,000 feet, and the hardwood cut, 7,315,491,000. In these seven years the softwood cut increased over 4 billion feet, while the hardwood cut decreased more than 1,300,000,000 feet; in other words, the hardwoods in 1899 amounted to nearly 25 per cent of the total, and in 1906 to less than 19.5 per cent. Since 1899 among softwoods the cut of yellow pine has increased 20.7 per cent, that of western pine 46.9 per cent, that of cypress 69.3 per cent, that of redwood 83.2 per cent, and that of Douglas fir 186.2 per cent; which far more than counterbalance the decrease of 40.8 per cent in white pine. On the other hand, the cut of the two most important hardwoods, oak and poplar, has decreased 36.4 per cent and 38.7 per cent, respectively. Of the less important woods, chestnut and basswood have increased decidedly, while cottonwood and elm have fallen off heavily.

Yellow pine is still far in the lead as a lumber producer, as it has been for a long time. White pine, however, which was second until a year or two ago, is now third and has been supplanted by Douglas fir, which was fifth in 1899. The production of hemlock has been very constant, and that wood is still in the fourth place, as in 1899. Oak has dropped from third to fifth place. Spruce still remains sixth.

A comparison of the lumber production of the principal States in 1899 and 1906, in the order of their importance in 1906, is given in Table 2.

TABLE 2.—*Comparison of lumber production of leading States, 1899, 1904, 1906*

State.	1899	1904	1906	Per cent increase (+) or decrease (—) since 1899.
	M feet.	*M feet.*	*M feet.*	
Washington	1,428,205	2,485,628	**4,305,053**	+201.5
Louisiana	1,113,423	2,459,327	**2,796,395**	+151.1
Wisconsin	3,361,943	2,623,157	**2,331,305**	— 30.7
Michigan	3,012,057	2,006,670	**2,094,279**	— 30.5
Mississippi	1,202,334	1,727,391	**1,840,250**	+ 53.0
Arkansas	1,595,933	1,680,536	**1,839,368**	+ 15.2
Minnesota	2,341,619	1,942,248	**1,794,144**	— 23.4
Texas	1,230,904	1,406,473	**1,741,473**	+ 41.5
Pennsylvania	2,321,284	1,738,972	**1,620,881**	— 30.2
Oregon	734,181	987,107	**1,604,894**	+118.0
California	734,232	1,077,499	**1,348,559**	+ 83.7
North Carolina	1,278,399	1,318,411	**1,222,974**	— 4.3
Maine	756,515	863,860	**1,088,747**	+ 43.9
Virginia	956,169	949,797	**1,063,241**	+ 11.2
Alabama	1,096,539	1,243,988	**1,009,783**	— 7.9
West Virginia	773,583	855,880	**976,173**	+ 26.2
Florida	788,905	812,693	**888,137**	+ 12.6
Georgia	1,308,610	1,135,910	**831,675**	— 36.4
New York	874,754	581,976	**810,949**	— 7.3
Kentucky	765,343	586,371	**661,299**	— 23.4

TABLE 2.—*Comparison of lumber production of leading States, etc.*—Continued.

State.	1899	1904	1906	Per cent increase (+) or decrease (−) since 1899.
	M feet.	*M feet.*	*M feet.*	
Tennessee	939,463	775,885	**634,587**	− 32.5
South Carolina	466,109	609,769	**566,928**	+ 21.6
New Hampshire	562,258	491,591	**539,259**	− 4.1
Missouri	715,968	553,940	**507,084**	− 29.2
Indiana	977,878	563,853	**447,808**	− 54.3
Ohio	957,239	420,905	**438,775**	− 54.1
Idaho	65,331	211,447	**418,944**	+541.3
Massachusetts	342,058	262,467	**354,483**	+ 3.6
All others	2,085,848	1,761,379	**1,773,289**	− 15.0
Total	34,787,084	34,135,139	**37,550,736**	+ 7.9

The changes which have taken place in the cut of the various species are strikingly reflected in this table. The cut of Idaho in 1906 was more than six times that of 1899, that of Washington was triple, and that of Oregon more than double. In the same length of time the lumber production of Louisiana increased 151.1 per cent, that of California 83.7 per cent, and that of Mississippi 53 per cent. On the other hand, the cuts of Indiana and Ohio decreased 54 per cent, that of Georgia 36.4 per cent, and that of Wisconsin and Michigan 30 per cent.

It is interesting to carry these comparisons back to the earliest date for which figures upon the lumber cuts in the various States are available, to show the shifting which has taken place in the sources of our lumber supply. Michigan, for instance, furnished 23 per cent of the lumber production of the United States in 1880, but only 5.6 per cent in 1906. Louisiana cut 0.7 per cent of the total of 1880, and 7.4 per cent of that of 1906. Washington furnished only 0.9 per cent of the lumber production in 1880, and 11.5 per cent of that of twenty-six years later. The great lumber-producing centers moved first from the pine and spruce forests of New England westward through New York and Pennsylvania to the white-pine region of the Lake States, and then swung southward to the great yellow-pine belt. Now, however, the Pacific Northwest is rapidly assuming the position of chief importance, and lumber from California, Oregon, and Washington is steadily working its way eastward across the plains and the prairies. The Pacific coast at present contains the country's greatest supply of virgin timber, yet lumbering in that region is heavy and is increasing.

The quantity and value of the lumber production of the United States by species in 1906 are shown in Table 3. The total quantity was 37,550,736,000 feet, valued at $621,151,388 at the mill, an average of $16.60 per M.

TABLE 3.—*Production of lumber by species, 1906.*

Kind.	M feet.	Per cent.	Total value.	Value per M feet.
Yellow pine	11,661,077	31.1	$175,178,446	$15.02
Douglas fir	4,969,843	13.2	70,567,141	14.20
White pine	4,583,727	12.2	83,952,701	18.32
Hemlock	3,537,329	9.4	54,153,242	15.31
Oak	2,820,393	7.5	61,377,266	21.76
Spruce	1,644,987	4.4	28,515,439	17.33
Western pine	1,386,777	3.7	19,423,937	14.01
Maple	882,878	2.4	13,714,083	15.53
Cypress	839,276	2.2	18,403,392	21.94
Poplar	683,132	1.8	16,538,260	24.21
Redwood	659,678	1.8	10,978,759	16.64
Red gum	453,678	1.2	6,102,886	13.46
Chestnut	407,379	1.1	7,128,864	17.49
Basswood	376,838	1.0	7,029,950	18.66
Birch	370,432	1.0	6,384,705	17.24
Cedar	357,845	1.0	6,484,600	18.12
Beech	275,661	.7	3,873,436	14.05
Cottonwood	263,996	.7	4,525,565	17.15
Elm	224,795	.6	4,066,035	18.08
Ash	214,460	.6	5,222,477	24.35
Larch	166,078	.4	1,978,709	11.91
Hickory	148,212	.4	4,508,583	30.42
Sugar pine	133,640	.4	2,152,662	16.11
Tamarack	123,395	.3	1,926,627	15.63
White fir	104,329	.3	1,346,317	12.91
Walnut	48,174	.1	2,033,718	42.25
Tupelo	47,882	.1	676,476	14.13
All others	164,845	.4	2,907,112	17.63
Total	37,550,736	100.0	621,151,388	16.60

Over 31 per cent of the total cut was furnished by yellow pine, while white pine and Douglas fir compete closely for second place, with an advantage of 1 per cent in favor of fir. The seven woods of which the annual cut is more than 1,000,000 feet each are yellow pine, Douglas fir, white pine, hemlock, oak, spruce, and western pine, which together furnish over four-fifths of the total production. The rank in point of value varies greatly, however, from that based upon the quantity produced. Of the woods which are cut in quantities exceeding one-half million feet each, poplar has the highest average value, $24.21 per M, and western pine the lowest, $14.01. The average values of oak and cypress are nearly the same, $21.76 for the former and $21.94 for the latter. Of the coniferous woods besides cypress white pine is the most valuable and averages $18.32 per M, $3.30 more than yellow pine and $4.12 more than Douglas fir, its leading competitors. Of the hardwoods, walnut, at $42.25, is the highest priced, owing to its small production and its use in high-class work. Of the other hardwoods hickory and ash lead, with $30.42 and $24.35 per M, respectively. The lowest-priced woods are larch, at $11.91, and white fir, at $12.91.

The average mill values per M of the various kinds of lumber in 1899, 1904, and 1906 are given in Table 4. In almost every case the values of 1904 are greater than those of 1899 and without exception those of 1906 exceed and often greatly exceed those of the first year quoted.

TABLE 4.—*Average value per M, by species, 1899, 1904, and 1906.*

Kind.	Average value per M.			Per cent increase since 1899.
	1899	1904	1906	
Yellow pine	$8.48	$9.97	$15.02	77.0
Douglas fir	8.67	9.51	14.20	63.0
White pine	12.66	14.93	18.32	45.0
Hemlock	9.98	11.91	15.31	54.0
Oak	13.78	17.51	21.76	59.0
Spruce	11.27	14.03	17.33	53.8
Western pine	9.70	11.29	14.01	44.0
Maple	11.83	14.94	15.38	30.0
Cypress	13.32	17.50	21.94	64.0
Poplar	14.03	18.99	24.21	73.0
Redwood	10.12	12.59	16.64	64.0
Red gum	9.63	10.87	13.46	40.0
Chestnut	13.37	13.78	17.49	30.0
Basswood	12.84	16.86	18.66	45.0
Birch	12.50	15.44	17.24	37.0
Cedar	10.91	14.35	18.12	66.0
Beech	(a)	(a)	14.05	.....
Cottonwood	10.37	14.92	17.15	65.0
Elm	11.47	14.45	18.08	58.0
Ash	15.84	18.77	24.35	54.0
Larch	(a)	(a)	11.91	.....
Hickory	18.78	23.94	30.42	61.0
Sugar pine	12.30	(a)	16.11	31.0
Tamarack	8.73	11.39	15.63	80.0
White fir	(a)	(a)	12.91	.....
Walnut	36.49	(a)	42.25	16.0
Tupelo	(a)	(a)	14.13	.....
All others	18.25	20.30	22.20	21.7
Average	11.08	12.76	16.60	49.0

a Not separately reported.

Yellow pine advanced from $8.48 per M in 1899 to $15.02 in 1906, 77 per cent. Cedar rose from $10.91 to $18.12, 66 per cent; cypress, from $13.32 to $21.94, and redwood from $10.12 to $16.64, 64 per cent in each case. Douglas fir increased from $8.67 to $14.20, 63 per cent, and poplar from $14.03 to $24.21, or 73 per cent. Notable increases are also shown by hickory, oak, spruce, western pine, hemlock, and ash.

Table 5 gives the lumber production by States in 1906. Washington with nearly 4⅓ billion feet, ranks first with 11.5 per cent, followed by Louisiana with 7.4 per cent, Wisconsin with 6.2 per cent, and Michigan with 5.6 per cent, the latter having a production of a little over 2 billion feet. The States which produced between 1½ and 2 billion feet are Mississippi, Arkansas, Minnesota, Texas, Pennsylvania, and Oregon; while those which produced between 1 and 1½ billion feet are California, North Carolina, Maine, Virginia, and Alabama. These 15 States furnished nearly three-quarters of the lumber produced in the United States last year.

TABLE 5.—*Production of lumber by States, 1906.*

State.	M feet.	Per cent.	Total value.	Value per M feet.
Washington	4,305,053	11.5	$62,162,840	$14.44
Louisiana	2,796,395	7.4	46,460,499	16.61
Wisconsin	2,331,305	6.2	39,997,360	17.16
Michigan	2,094,279	5.6	33,357,883	15.93
Mississippi	1,840,250	4.9	30,950,278	16.81
Arkansas	1,839,368	4.9	29,657,784	16.12
Minnesota	1,794,144	4.8	31,243,835	17.41
Texas	1,741,473	4.6	26,111,477	14.99
Pennsylvania	1,620,881	4.3	29,804,260	18.39
Oregon	1,604,894	4.3	22,358,673	13.93
California	1,348,559	3.6	20,726,799	15.37
North Carolina	1,222,974	3.3	19,066,437	15.59
Maine	1,088,747	2.9	18,369,334	16.87
Virginia	1,063,241	2.8	16,187,028	15.22
Alabama	1,009,783	2.7	15,706,600	15.55
West Virginia	976,173	2.6	18,245,195	18.69
Florida	888,137	2.4	15,538,716	17.50
Georgia	831,675	2.2	12,792,888	15.38
New York	810,949	2.1	17,241,866	21.26
Kentucky	661,299	1.8	13,170,127	19.92
Tennessee	634,587	1.7	13,485,630	21.25
South Carolina	566,928	1.5	8,959,042	15.80
New Hampshire	539,259	1.4	8,356,002	15.50
Missouri	507,084	1.3	8,025,223	15.83
Indiana	447,808	1.2	11,044,323	24.66
Ohio	438,775	1.2	10,589,568	24.13
Idaho	418,944	1.1	5,966,157	14.24
Massachusetts	354,483	.9	5,507,655	15.54
Vermont	329,422	.9	5,474,004	16.61
Montana	328,727	.9	4,330,834	13.18
Maryland	219,098	.6	3,755,439	17.14
Iowa	163,747	.4	3,723,915	22.74
Illinois	141,374	.4	3,073,482	21.74
Connecticut	124,880	.3	2,300,427	18.42
Colorado	110,212	.3	1,359,258	12.33
New Mexico	103,079	.3	1,935,686	18.78
Arizona	56,960	.2	875,886	15.38
Indian Territory	48,694	.1	635,417	13.05
Delaware	44,487	.1	545,219	12.26
New Jersey	36,253	.1	921,536	25.42
South Dakota	22,634	.1	359,254	15.87
Rhode Island	21,528	.1	377,243	17.52
Wyoming	13,213	(a)	197,943	14.99
Utah	7,768	(a)	118,176	15.21
All others (Kansas and Oklahoma)	1,213	(a)	84,190	77.00
Total	37,550,736	100.0	621,151,388	16.60

a Less than 0.1 per cent.

Washington, which was the fifth State in lumber production in 1900, became second in 1904 and first in 1905, displacing Wisconsin in the latter year. The advance of Louisiana in point of importance has also been striking. It was eleventh in 1899, third in 1904, and second in 1906. This advance is due to the fact that the State furnishes a large proportion of the cypress cut, and leads in yellow pine. Wisconsin, which was first in 1899 and 1904, is now third, and probably will not hold that place long, because of the great decrease of white pine production in that State.

As was noted in the discussion of Table 3, the greatest production of lumber does not necessarily mean the greatest value. Consequently the rank of the States based upon value of lumber production differs somewhat from that based upon quantity, though the four States which are first in quantity—Washington, Louisiana, Wisconsin, and Michigan—have also the same rank based upon value. But

the value of the lumber production of Minnesota, for instance, exceeds that of Mississippi, although the quantity is less, and the value of the production of Pennsylvania exceeds that of Texas and Arkansas. The very high value per M ($77), shown under the heading "All others," is due to the fact that most of the lumber was walnut.

LUMBER PRODUCTION BY SPECIES.

Tables 6 to 32 give the quantity and value of each kind of lumber cut in the various States in 1906 in the order of their importance.

YELLOW PINE.

Under the heading " Yellow pine " are grouped all the reports of pine production in the East and South, except those upon white and Norway pine. Several species, such as pitch pine, loblolly pine, Cuban pine, shortleaf pine, and longleaf pine, enter into the total. A large proportion of the cut, however, probably 50 per cent, is composed of longleaf pine, while the remainder is chiefly shortleaf and loblolly. Most of the cut in Texas, Louisiana, Mississippi, Alabama, Georgia, and Florida is longleaf pine, while practically all that of Arkansas and Missouri is shortleaf. Most of the pine cut in Virginia and North and South Carolina is loblolly, or, as it is widely known commercially, North Carolina pine.

Reports of yellow pine production were received from 30 States. The total was 11,661,077,000 feet, valued at $175,178,446, or $15.02 per M, as shown by Table 6.

TABLE 6.—*Cut of yellow pine, 1906.*

State.	M feet.	Per cent.	Total value.	Value per M feet.
Louisiana	2,120,615	18.2	$31,919,636	$15.05
Texas	1,720,043	14.8	25,711,088	14.95
Mississippi	1,509,554	13.0	24,387,901	16.16
Arkansas	1,271,618	10.9	18,754,844	14.75
Alabama	936,493	8.0	14,268,768	15.24
North Carolina	899,042	7.7	12,406,188	13.80
Florida	800,844	6.9	13,321,947	16.63
Georgia	761,842	6.5	11,445,404	15.02
Virginia	703,598	6.0	9,311,998	13.23
South Carolina	527,240	4.5	8,251,020	15.65
Missouri	176,526	1.5	2,164,881	12.26
Maryland	63,870	.5	857,425	13.42
All others (14)	169,792	1.5	2,377,346	14.00
Total	11,661,077	100.0	175,178,446	15.02

Louisiana is now the leading State in yellow pine production, with an annual cut of over 2 billion feet. Texas cuts nearly 1¾ billion, Mississippi a little more than 1½ billion, and Arkansas over 1¼ billion. The production of these four States aggregates nearly three-fifths of the whole. The annual cut of yellow pine is still increasing slightly, but the center of production is moving westward; in 1899,

for instance, Georgia was first, while now it is eighth, and North Carolina, which was second, is now sixth.

The average mill value of yellow pine lumber varies from $12.26 per M in Missouri to $16.63 in Florida. The difference in kind of timber cut accounts to some extent for this range; the cut of Missouri is all shortleaf and that of Florida nearly all longleaf, and a considerable portion of it export timber. While the total quantity of yellow pine lumber cut has increased less than 21 per cent since 1899, the mill value of the output has risen 114 per cent—from $81,946,073 in 1899 to $175,178,446 in 1906.

DOUGLAS FIR.

The total cut of Douglas fir for 1906 was nearly 5 billion feet, valued at over 70 million dollars, of which the State of Washington furnished more than two-thirds and Oregon more than one-fourth. California cut about 127 million feet; Montana, Idaho, and five other States, small amounts.

TABLE 7.—*Cut of Douglas fir, 1906.*

State.	M feet.	Per cent.	Total value.	Value per M feet.
Washington	3,405,510	68.5	$48,841,166	$14.34
Oregon	1,347,467	27.2	18,869,690	14.00
California	127,149	2.5	1,687,480	13.27
Montana	41,537	.8	510,039	12.28
Idaho	34,670	.7	455,421	13.14
All others (5)	13,510	.3	203,345	15.05
Total	4,969,843	100.0	70,567,141	14.20

The cut of Douglas fir in 1906 was 186.2 per cent greater than that in 1899, while the value increased 370 per cent. The average mill values of Douglas fir lumber reported from Washington and Oregon, where conditions of manufacture are similar, are nearly the same, $14.34 in Washington and $14 in Oregon.

There is still a large amount of virgin Douglas fir stumpage in the Northwest, and the indications are that the cut will increase for a number of years.

WHITE PINE.

White pine is one of the most widely distributed species throughout the North and East. Reports of lumber produced from it were received from 31 States. Two-thirds of the cut, however, comes from the Lake States, as shown by Table 8. In this table Norway or red pine is included with white pine. It is impossible to get accurate reports upon the cut of Norway pine, as it is often manufactured and sold with white pine in the Lake States under the common name of northern pine. Common lumber, under the rules of the Northern

Pine Manufacturers Association, may consist of either white or Norway pine or a mixture of the two. The proportion of Norway pine to true white pine has increased within recent years, and it is probably safe to say that at present nearly one-third of the pine cut in the Lake States is Norway pine. This indicates a total Norway pine production of about 1 billion feet.

TABLE 8.—*Cut of white pine, 1906.*

State.	M feet.	Per cent.	Total value.	Value per M feet.
Minnesota	1,664,734	36.2	$29,072,499	$17.46
Wisconsin	933,169	20.4	18,480,287	19.80
Michigan	435,211	9.5	9,234,874	21.22
New Hampshire	332,319	7.3	4,947,740	14.89
Maine	291,663	6.4	4,797,603	16.45
Massachusetts	230,763	5.1	3,391,930	14.70
Iowa	140,909	3.1	3,276,896	23.26
New York	111,950	2.4	2,462,900	22.00
Pennsylvania	96,564	2.1	2,323,375	24.06
Idaho	84,314	1.8	1,326,532	15.73
North Carolina	39,637	.9	695,967	17.56
Virginia	33,784	.7	530,113	15.69
West Virginia	31,322	.7	594,407	18.98
Tennessee	28,600	.6	541,980	18.95
Connecticut	25,611	.6	443,409	17.31
Vermont	24,944	.5	433,748	17.39
Washington	23,415	.5	391,441	16.72
All others (14)	54,818	1.2	1,007,000	18.37
Total	4,583,727	100.0	83,952,701	18.32

Minnesota is far in the lead as a white pine producer, and over one-third of the total quantity comes from there. Wisconsin is cutting one-fifth of the total production, and Michigan nearly one-tenth. The cut in all these States is rapidly decreasing because of the depletion of the forests. The pine cut of Michigan in 1906 was only about one-third of that in 1899, that of Wisconsin about two-fifths, and that of Minnesota less than three-fourths. Iowa is credited with some 140 million feet, but this was from northern timber which was brought down the Mississippi to be sawed. The white pine production of New York and New England is running pretty steady; while locally important, it is not large, and in New England consists to a considerable extent of second growth timber.

It is worthy of remark that the Southern Appalachian region in Virginia, West Virginia, North Carolina, and Tennessee cut over 130 million feet of white pine last year, compared with a very small output in 1899. It is also interesting to note that a production of 112 million feet of white pine was reported from Idaho, Montana, and Washington. This is the western white pine (*Pinus monticola*) and should not be confused with the so-called western white pine or California white pine (*Pinus ponderosa*), which is given under the heading of "Western pine," Table 12. The western white pine is cut principally in the territory known locally as the "Inland

Empire," comprising western Montana, northern Idaho, and eastern Washington.

The decrease in the cut of white pine has been accompanied by a strong increase in value, so that while the production has fallen off over 40 per cent since 1899 the mill value of the lumber has declined only about 14 per cent. The white pine of the Lake States has played a wonderful part in the development of the United States, particularly in furnishing material for home building on the prairies and plains from the seventies to the nineties. For more than twenty years Michigan was the leading lumber-producing State of the Union, and it has been estimated that the total amount of pine lumber cut in this State exceeded 160 billion feet, with a value at the point of production of not less than $2,000,000,000, or nearly 50 per cent more than has been added to the wealth of the Nation by the gold fields of California since their discovery in 1848.

HEMLOCK.

Hemlock is widely distributed; reports of hemlock lumber production were received from 29 States, although three States, Pennsylvania, Wisconsin, and Michigan, furnished nearly three-fourths of the total. The production of the hemlock lumber in 1906 was 3,537,329,000 feet, valued at $54,153,242, or $15.31 per M.

TABLE 9.—*Cut of hemlock, 1906.*

State.	M feet.	Per cent.	Total value.	Value per M feet.
Pennsylvania	966,480	27.3	$16,589,522	$17.16
Wisconsin	826,908	23.4	11,928,593	14.43
Michigan	797,883	22.6	10,695,489	13.40
West Virginia	219,959	6.2	3,545,928	16.12
New York	208,848	5.9	3,968,112	19.00
Maine	118,294	3.3	1,745,519	14.76
Washington	90,002	2.5	1,100,470	12.23
Vermont	56,042	1.6	925,336	16.51
New Hampshire	54,858	1.6	814,451	14.85
Maryland	34,722	1.0	544,645	15.69
Massachusetts	31,271	.9	465,352	14.88
North Carolina	28,727	.8	377,597	13.14
Tennessee	23,666	.7	331,119	13.99
Virginia	22,029	.6	319,163	14.49
Kentucky	21,449	.6	271,215	12.64
All others (14)	36,191	1.0	530,731	14.67
Total	3,537,329	100.0	54,153,242	15.31

Pennsylvania, as it has for a long time, still leads in hemlock production, with more than 27 per cent of the total, though the cut in that State in 1906 was 38 per cent less than in 1899. The cut in Michigan has decreased slightly in the last seven years, while that of Wisconsin has more than doubled. Apparently Wisconsin will soon outrank Pennsylvania. There has been a notable increase in the cut of hemlock in the Southern Appalachian region, in the States of West Virginia, Virginia, Tennessee, Kentucky, and North Carolina.

The cut of West Virginia, the most important of this group, increased 153 per cent in the last seven years, while in the other four States the hemlock production, which was almost neligible in 1899, reached more than 74 million feet in 1906.

It is also notable that the State of Washington, where a few years ago practically no hemlock lumber was produced, reported a cut of 90,000,000 feet last year. This is the western species of hemlock, the wood of which is superior in some respects to that of the eastern species; and it is probable that its output will soon increase considerably.

There has been a striking increase in the values of hemlock lumber in the various regions, caused partly by the rise in price of other kinds of lumber and partly by the recognition of the fact that hemlock, once a despised and neglected wood, is really a useful timber for many purposes. While the total quantity of hemlock reported in 1906 was but little more than 3 per cent more than that reported in 1899, the total value of the 1906 cut was 58 per cent greater.

OAK.

The oaks are among the most widely distributed species of the United States, and reports of oak lumber production in greater or less quantity were received from 37 States. In Table 10 the several species of oaks are not distinguished, since it is impossible, as the reports are made, to draw any certain line of distinction between them. The principal species which are cut for lumber, however, are white oak, red oak, chestnut oak, cow oak, chinquapin oak, bur oak, and Spanish oak. Of the total quantity of oak reported for 1906 about two-thirds was classified with the white oak group, and about one-third with the red oak group.

TABLE 10.—*Cut of oak, 1906.*

State.	M feet.	Per cent.	Total value.	Value per M feet.
Kentucky	339,829	12.0	$6,667,701	$19.62
West Virginia	314,961	11.2	5,988,533	19.01
Tennessee	274,974	9.8	6,257,436	22.76
Ohio	244,673	8.7	5,864,674	23.97
Pennsylvania	243,110	8.6	5,429,430	22.33
Indiana	221,120	7.8	5,942,767	26.88
Arkansas	218,896	7.8	4,388,448	20.05
Virginia	158,456	5.6	3,156,180	19.92
Missouri	143,608	5.1	2,762,883	19,24
Mississippi	119,370	4.2	2,892,721	24.23
North Carolina	107,262	3.8	2,362,382	22.02
Illinois	70,767	2.5	1,602,274	22.64
Maryland	64,929	2.3	1,394,238	21.47
Wisconsin	45,996	1.6	1,092,929	23.76
Alabama	32,976	1.2	737,053	22.35
Michigan	27,647	1.0	670,857	24.27
New York	24,116	.9	723,480	30.00
Georgia	24,050	.9	404,687	16.83
Connecticut	23,817	.8	530,609	22.28
All others (18)	119,836	4.2	2,507,984	20.92
Total	2,820,393	100.0	61,377,266	21.76

The cut of oak lumber reported in 1906 was 2,820,393,000 feet, valued at $61,377,266, or $21.76 per M. The cut of oak is decreasing rapidly; it has fallen off more than 36 per cent in the past seven years. Kentucky now leads in its production and furnished 12 per cent of the total in 1906, followed closely by West Virginia with 11.2 per cent. The next States in importance, all fairly close together, are Tennessee, Ohio, Pennsylvania, Indiana, and Arkansas. In 1899 Indiana was the first State in oak production, with a cut of nearly 650 million feet; now it ranks sixth, with a cut of only 34 per cent of that of seven years ago. Ohio, which was second in 1899, suffered a decrease of 59 per cent, and now is fourth. Even Kentucky, West Virginia, and Tennessee, the leading States, all produce less oak lumber than formerly. The only States of any importance in oak production which have increased their output recently are Virginia, North Carolina, and Mississippi, and they furnish only about one-eighth of the whole.

The shortage of oak lumber is strongly reflected in the mill values. The total value reported in 1906 is slightly greater than that of 1899, notwithstanding the fact that less than two-thirds of the quantity was produced. The lowest average mill value per M reported was $16.83 in Georgia and the highest $30 in New York.

SPRUCE.

The cutting of spruce lumber in 1906 was reported from 27 States, but three-fifths of the total quantity was furnished by three—Maine, Washington, and New York.

TABLE 11.—*Cut of spruce, 1906.*

State.	M feet.	Per cent.	Total value.	Value per M feet.
Maine	557,975	33.8	$9,802,083	$17.57
Washington	243,493	14.8	3,557,335	14.61
New York	210,123	12.8	4,307,521	20.50
West Virginia	161,834	9.8	2,934,678	18.13
Vermont	136,867	8.3	2,366,094	17.29
New Hampshire	90,156	5.5	1,608,101	17.84
Oregon	78 652	4.8	1,188,638	15.11
Virginia	29,496	1.8	515,543	17.48
Minnesota	27,682	1.7	494,880	17.88
Massachusetts	26,068	1.6	465,901	17.90
Colorado	23,991	1.5	316,472	13.19
All others (16)	58,650	3.6	958,193	16.35
Total	1,644,987	100.0	28,515,439	17.33

Maine has for many years been the leading spruce-producing State and maintained its position in 1906, when it supplied over one-third of the total and more than double the quantity furnished by its closest competitor, Washington. The cut of spruce in Washington, however, is rapidly increasing, and was nearly three times as much

in 1906 as in 1899. The cut of New York has fallen off recently, and that of Vermont and New Hampshire has decreased about one-half since 1899. In the Eastern States the principal increase in the cut of spruce has taken place in West Virginia.

For the country as a whole there has been a small increase in the cut of spruce. The price, however, has risen so much that the total mill value of the 1,664,987,000 feet cut in 1906 was $28,515,439, against $16,322,666 for the 1,448,091,000 feet cut in 1899.

In addition to the spruce which is cut for lumber, large quantities are also used for the manufacture of pulp, particularly in New York and New England. Altogether, about three-fifths as much spruce was used for pulp as for lumber in the United States in 1906.

WESTERN PINE.

The term "western pine" is here used to designate the species known botanically as *Pinus ponderosa*, or western yellow pine, and commercially as "California white pine," "western white pine," and "western pine." This tree is widely distributed throughout the Rocky Mountain and Pacific coast States. The cut of western pine in 1906 was 1,386,777,000 feet, valued at $19,423,937, an average of $14.01 per M.

TABLE 12.—*Cut of western pine, 1906.*

State.	M feet.	Per cent.	Total value.	Value per M feet.
California	347,249	25.0	$4,826,436	$13.90
Washington	265,820	19.2	3,377,417	12.71
Idaho	210,305	15.1	3,081,870	14.65
Montana	165,849	12.0	2,359,545	14.23
Oregon	131,460	9.5	1,603,909	12.20
New Mexico	92,467	6.7	1,773,252	19.18
Colorado	81,724	5.9	987,805	12.09
Arizona	56,586	4.1	872,754	15.42
South Dakota	22,534	1.6	357,654	15.87
All others (2)	12,783	.9	183,295	14.34
Total	1,386,777	100.0	19,423,937	14.01

California, the leading State in western pine production, cut one-fourth of the total last year. Washington produced nearly one-fifth of the entire quantity reported, Idaho between one-sixth and one-seventh, and Montana not quite one-eighth.

The production of western pine lumber has increased nearly one-half since 1899, largely on account of the additional cuts in Washington and Idaho, and the value of the product has more than doubled in that period.

MAPLE.

The cutting of maple lumber in 1906 was reported from 29 States. More than half of the total was furnished by Michigan. Wisconsin

ranks second, but furnishes little more than one-sixth of the quantity produced by Michigan. Next in order come Pennsylvania, New York, and Vermont.

TABLE 13.—*Cut of maple, 1906.*

State.	M. feet.	Per cent.	Total value.	Value per M feet.
Michigan	492,845	55.8	$7,096,204	$14.40
Wisconsin	84,740	9.6	1,173,357	13.85
Pennsylvania	75,081	8.5	1,221,905	16.27
New York	60,566	6.9	1,544,433	25.50
Vermont	34,859	4.0	530,249	15.21
Indiana	29,555	3.3	525,298	17.77
Ohio	23,071	2.6	382,208	16.57
West Virginia	20,278	2.3	261,385	12.89
All others (21)	61,883	7.0	979,044	15.82
Total	882,878	100.0	13,714,083	15.53

The cut of maple in Michigan has grown nearly 25 per cent since 1899, and increases in the output of all the other important States have also taken place. The value of the total cut has increased over 80 per cent in the same time.

CYPRESS.

Cypress reaches its most extensive development in the swamps of Louisiana, and this State furnished over 68 per cent of the 1906 production. In the whole United States 839,276,000 feet were cut, valued at more than $18,400,000, or nearly $22 per M. Florida furnished nearly one-tenth of the output, and the remainder came from 15 other States.

TABLE 14.—*Cut of cypress, 1906.*

State.	M feet.	Per cent.	Total value.	Value per M feet.
Louisiana	573,096	68.3	$12,849,911	$22.42
Florida	82,834	9.9	2,016,977	24.35
Mississippi	44,528	5.3	881,695	19.80
Arkansas	38,780	4.6	687,633	17.73
North Carolina	21,710	2.6	415,565	19.14
South Carolina	21,368	2.5	440,977	20.64
Missouri	16,465	2.0	270,596	16.43
Georgia	15,908	1.9	375,893	23.63
All others (9)	24,587	2.9	464,145	18.88
Total	839,276	100.0	18,403,392	21.94

The cut of cypress in Louisiana has more than doubled since 1899, but relatively small changes have taken place in the output of the other States. The total cut in 1906 was 69.3 per cent greater than that of 1899, while the reported mill value increased 179 per cent during the same period.

POPLAR.

Three-fifths of the lumber produced from this valuable wood in 1906 was furnished by Kentucky, West Virginia, and Tennessee.

The total cut was 683,132,000 feet, valued at $16,538,260, or $24.21 per M.

TABLE 15.—*Cut of poplar, 1906.*

State.	M feet.	Per cent.	Total value.	Value per M feet.
Kentucky	160,123	23.4	$3,732,465	$23.31
West Virginia	129,652	19.0	3,230,434	24.92
Tennessee	127,881	18.7	3,025,395	23.66
Virginia	61,344	9.0	1,417,417	23.11
Ohio	58,358	8.6	1,708,458	29.28
North Carolina	58,080	8.5	1,344,167	23.14
Indiana	25,234	3.7	732,433	29.03
Georgia	15,106	2.2	297,159	19.67
Alabama	12,270	1.8	241,933	19.72
All others (20)	35,084	5.1	808,399	23.05
Total	683,132	100.0	16,538,260	24.21

The cut of poplar has decreased in every State of importance. Since 1899 the production in Kentucky has fallen off over 41 per cent, that in West Virginia nearly 33 per cent, and that in Tennessee over 52 per cent. This decrease has been accompanied by such a rise in value, however, that the total value of the 1906 production exceeded by $891,929 that of the much greater output of 1899.

REDWOOD.

Redwood is an exclusively California product, and that State furnished 659,678,000 feet, valued at $10,978,759, or $16.64 per M. Even in California only small portions of the State contribute to the redwood production, which is of two kinds—the coast redwood, which is restricted to a narrow belt near the coast, principally north of San Francisco, and the big tree, which occurs in scattering groves along the western slopes of the Sierras.

TABLE 16.—*Cut of redwood, 1906.*

State.	M feet.	Per cent.	Total value.	Value per M feet.
California	659,678	100.0	$10,978,759	$16.64

The cut of big tree lumber was less than 8½ million feet, and was reported from Calaveras, Fresno, and Tulare counties. The coast redwood was cut principally in Humboldt and Mendocino counties—51.5 per cent in the former and 28.6 per cent in the latter. The total redwood production in 1906 was over 80 per cent more than that of 1899, and the total value in 1906 was three times as great as that seven years before.

RED GUM.

The production of red-gum lumber in 1906 was reported from 21 States, but more than two-thirds of the whole quantity was furnished

by Arkansas, Missouri, and Mississippi. The total was 453,678,000 feet, valued at $6,102,886, or $13.46 per M. The cut of red gum in 1906 was much greater than that in 1899, but less than in 1904, so evidently the maximum output of this species has been passed.

TABLE 17.—*Cut of red gum, 1906.*

State.	M feet.	Per cent.	Total value.	Value per M feet.
Arkansas	140,819	31.0	$1,774,394	$12.60
Missouri	95,184	21.0	1,213,440	12.75
Mississippi	73,412	16.2	998,106	13.60
Tennessee	35,250	7.8	574,528	16.30
Kentucky	26,728	5.9	379,029	14.18
Indiana	21,036	4.6	312,171	14.84
Louisiana	12,855	2.8	225,448	17.54
Illinois	9,878	2.2	136,871	13.86
North Carolina	8,598	1.9	113,999	13.26
Alabama	8,436	1.9	113,966	13.51
All others (11)	21,482	4.7	260,934	12.15
Total	453,678	100.0	6,102,886	13.46

CHESTNUT.

Chestnut is another widely distributed tree. The cutting of chestnut lumber was reported from 22 States in 1906, the total cut being 407,379,000 feet, valued at $7,128,864, an average of $17.49 per M.

TABLE 18.—*Cut of chestnut, 1906.*

State.	M feet.	Per cent.	Total value.	Value per M feet.
Pennsylvania	73,096	18.0	$1,268,989	$17.36
West Virginia	52,122	12.8	825,301	15.83
Connecticut	49,750	12.2	891,543	17.92
Tennessee	40,182	9.9	659,451	16.41
North Carolina	34,707	8.5	664,223	19.14
Massachusetts	30,325	7.4	523,446	17.26
Virginia	27,869	6.8	475,934	17.08
Kentucky	24,865	6.1	406,926	16.37
New York	22,696	5.6	431,224	19.00
Maryland	19,752	4.8	344,381	17.44
All others (12)	32,015	7.9	637,446	19.91
Total	407,379	100.0	7,128,864	17.49

Chestnut is characteristic of the Appalachian region and New England, and the leading States in its production are Pennsylvania, West Virginia, Connecticut, and Tennessee, which together furnished over one-half the entire output.

The cut of chestnut is increasing; that in 1906 was nearly double the product of 1899. The value in 1906 was 158 per cent greater than in the former year.

BASSWOOD.

Over three-fifths of the basswood lumber production in 1906 was furnished by Wisconsin and Michigan, and the cut in Wisconsin was more than double that in Michigan. Twenty-four other States con-

tributed to the total output of 376,838,000 feet, valued at $7,029,950, or $18.66 per M.

TABLE 19.—*Cut of basswood, 1906.*

State.	M feet.	Per cent.	Total value.	Value per M feet.
Wisconsin	162,155	43.0	$2,890,178	$17.82
Michigan	73,458	19.5	1,397,018	19.02
New York	28,850	7.7	692,400	24.00
Pennsylvania	17,932	4.7	337,269	18.81
West Virginia	17,480	4.6	320,592	18.34
Ohio	12,718	3.4	241,313	18.97
Minnesota	10,743	2.9	177,584	16.53
Vermont	9,482	2.5	154,259	16.27
Kentucky	9,436	2.5	169,176	17.93
Indiana	8,547	2.3	179,300	20.98
Tennessee	8,274	2.2	161,442	19.51
All others (15)	17,763	4.7	309,419	17.42
Total	376,838	100.0	7,029,950	18.66

The cut of basswood has apparently been fairly steady during the past seven years, with a slight increase. A decided increase in the mill value of the lumber, however, is shown by the fact that the 308,069,000 feet reported in 1899 had a value of less than $4,000,000, compared with more than $7,000,000 for the 376,838,000 feet in 1906.

BIRCH.

Two-fifths of the birch lumber production is furnished by Wisconsin, and over one-fourth by Michigan and New York together. The total reported cut in 1906 was 370,432,000 feet, valued at $6,384,705, or $17.24 per M. The cut in 1906 was more than two and one-half times that in 1899. Wisconsin has long been the first State in birch production, but Michigan has only recently attained second place.

TABLE 20.—*Cut of birch, 1906.*

State.	M feet.	Per cent.	Total value.	Value per M feet.
Wisconsin	151,063	40.8	$2,334,163	$15.45
Michigan	55,949	15.1	975,637	17.44
New York	50,142	13.6	1,153,266	23.00
Maine	30,533	8.2	586,792	19.22
Vermont	29,577	8.0	454,033	15.35
Pennsylvania	25,583	6.9	448,953	17.55
New Hampshire	15,605	4.2	246,264	15.78
All others (10)	11,980	3.2	185,597	15.50
Total	370,432	100.0	6,384,705	17.24

CEDAR.

Several species enter into the total cut of cedar lumber, which in 1906 was 357,845,000 feet, valued at $6,484,600, or $18.12 per M. Washington is the only State which produces any considerable quan-

tity of cedar lumber, and the cut there was almost two-thirds of the total for the United States. As cedar goes most largely into posts, poles, ties, and shingles, it is probable that not more than one-fourth of the total cut is represented by lumber.

TABLE 21.—*Cut of cedar, 1906.*

State.	M feet.	Per cent.	Total value.	Value per M feet.
Washington	236,648	66.2	$4,415,054	$18.66
Idaho	27,736	7.7	346,321	12.49
Michigan	24,265	6.8	426,223	17.57
Oregon	20,481	5.7	329,119	16.07
Maine	15,100	4.2	258,396	17.11
California	12,489	3.5	163,879	13.12
All others (18)	21,126	5.9	545,608	25.83
Total	357,845	100.0	6,484,600	18.12

BEECH.

Beech is a wood which has come into prominence so recently that it was not separately reported by the Census in 1899 and 1904. The Forest Service obtained reports of beech production in 1905, which showed 219,000,000 feet. The reports for 1906 aggregated 275,661,000 feet, valued at $3,873,436, or $14.05 per M. Beech is also widely distributed, and 25 States contributed to its production in 1906. Nearly three-fourths of the total quantity, however, was furnished by Michigan, Pennsylvania, New York, and Indiana.

TABLE 22.—*Cut of beech, 1906.*

State.	M feet.	Per cent.	Total value.	Value per M feet.
Michigan	76,281	27.7	$912,162	$11.96
Pennsylvania	53,892	19.6	719,151	13.34
New York	39,738	14.4	695,415	17.50
Indiana	31,501	11.4	530,792	16.85
Vermont	14,976	5.4	205,981	13.75
Maine	10,449	3.8	162,262	15.53
Ohio	8,904	3.2	132,181	14.85
New Hampshire	8,087	3.0	107,932	13.35
West Virginia	7,538	2.7	79,677	10.57
Wisconsin	7,431	2.7	103,093	13.87
All others (15)	16,864	6.1	224,790	13.31
Total	275,661	100.0	3,873,436	14.05

COTTONWOOD.

The production of cottonwood lumber in 1906 was reported from 28 States. More than three-fourths of it was cut in Arkansas, Mississippi, and Louisiana; more than one-third in Arkansas alone. Only relatively small quantities were produced in the other 25 States reporting cottonwood lumber. The production in 1906 was 263,996,000 feet, valued at $4,525,565, an average of $17.15 per M. The cut of

cottonwood is decreasing rapidly, but the 263,996,000 feet produced in 1906 had a greater mill value than the 415,124,000 feet cut in 1899.

TABLE 23.—*Cut of cottonwood, 1906.*

State.	M feet.	Per cent.	Total value.	Value per M feet.
Arkansas	92,610	35.1	$1,814,153	$19.59
Mississippi	59,840	22.7	982,839	16.42
Louisiana	52,672	20.0	763,205	14.49
Missouri	9,353	3.5	160,731	17.18
Indian Territory	9,352	3.5	116,322	12.44
Tennessee	7,478	2.8	150,619	20.14
Illinois	6,153	2.3	103,006	16.74
All others (21)	26,538	10.1	434,590	16.36
Total	263,996	100.0	4,525,565	17.15

ELM.

The production of elm lumber in 1906 amounted to 224,795,000 feet, valued at $4,066,035, or $18.08 per M. Thirty-two States reported, but three-fifths of the whole was furnished by Wisconsin, Indiana, Michigan, and Ohio. The production reported in 1906 was less than one-half that of 1899. It is probable that the quantity of elm used in the manufacture of slack cooperage stock considerably exceeds that used for lumber.

TABLE 24.—*Cut of elm, 1906.*

State.	M feet.	Per cent.	Total value.	Value per M feet.
Wisconsin	42,136	18.7	$720,590	$17.10
Indiana	34,580	15.4	660,451	19.10
Michigan	29,261	13.0	541,544	18.51
Ohio	29,058	12.9	541,729	18.64
New York	19,855	8.9	496,375	25.00
Missouri	15,251	6.8	233,690	15.32
Illinois	12,699	5.6	217,178	17.10
Arkansas	11,532	5.1	168,078	14.57
Pennsylvania	5,635	2.5	101,308	17.98
Tennessee	4,513	2.0	70,362	15.59
Kentucky	3,994	1.8	57,025	14.28
All others (21)	16,281	7.3	257,705	15.83
Total	224,795	100.0	4,066,035	18.08

ASH.

Ash lumber is cut in small quantities in many States, no one of which is far in the lead. The cut in 1906 amounted to 214,460,000 feet, valued at $5,222,477, or $24.35 per M, as given in Table 25. Michigan ranks first, with 11.4 per cent of the total, and Ohio second with 10 per cent. Arkansas, Indiana, and Wisconsin furnished nearly equal quantities. The cut of ash is decreasing, particularly in the Northern States, and while Michigan still leads, the output there in 1906 was less than 29 per cent that in 1899. Ash is a high-

priced lumber; the average mill value ranges from $20.37 per M in Michigan to $29.50 per M in Ohio.

TABLE 25.—*Cut of ash, 1906.*

State.	M feet.	Per cent.	Total value.	Value per M feet.
Michigan	24,500	11.4	$499,061	$20.37
Ohio	21,359	10.0	630,155	29.50
Arkansas	20,571	9.6	583,871	28.38
Indiana	19,631	9.2	527,261	26.86
Wisconsin	19,386	9.0	364,473	18.80
New York	15,585	7.3	374,040	24.00
Tennessee	12,404	5.8	327,801	26.43
Pennsylvania	9,484	4.4	240,186	25.33
Kentucky	8,999	4.2	211,596	23.51
Mississippi	8,850	4.1	221,778	25.06
Missouri	7,972	3.7	232,790	29.20
Vermont	5,184	2.4	106,072	20.46
North Carolina	4,769	2.2	126,290	26.48
All others (22)	35,766	16.7	777,103	21.73
Total	214,460	100.0	5,222,477	24.35

LARCH.

The cut of larch, or western tamarack, in 1906 amounted to 166,078,000 feet, valued at $1,978,709, or $11.91 per M. Almost all of the larch lumber is produced in those portions of Montana, Idaho, and Washington constituting the "Inland Empire." The extensive cutting of larch lumber is a recent development. The production in 1906 was more than four times that in 1899. It is a rather new timber upon the market, which, together with the fact that its weight makes its shipping charges higher than those of other woods produced in the same territory, tends to depress its mill value.

TABLE 26.—*Cut of larch, 1906.*

State.	M feet.	Per cent.	Total value.	Value per M feet.
Montana	91,488	55.1	$1,095,580	$11.98
Idaho	39,575	23.8	465,137	11.75
Washington	31,249	18.8	368,958	11.81
Oregon	3,766	2.3	49,034	13.02
Total	166,078	100.0	1,978,709	11.91

HICKORY.

The cutting of hickory lumber was reported to some extent from 32 States in 1906, but it is not safe to assume in every instance that hickory lumber credited to a particular State came from trees grown in that State. Valuable woods like hickory are often shipped to centers of consumption for sawing, and so it is not unusual for hickory logs from the South to be cut in Ohio and Indiana factories.

TABLE 27.—*Cut of hickory, 1906.*

State.	M feet.	Per cent.	Total value.	Value per M feet.
Arkansas	23,364	15.8	$902,201	$38.62
Indiana	21,931	14.8	684,945	31.23
Kentucky	19,134	12.9	479,264	25.05
Ohio	15,836	10.7	481,782	30.42
Tennessee	11,996	8.1	346,715	28.90
Missouri	10,630	7.2	313,372	29.48
Pennsylvania	9,389	6.3	254,477	27.10
Illinois	8,602	5.8	255,448	29.70
Mississippi	6,247	4.2	264,548	42.35
West Virginia	4,646	3.1	97,000	20.88
All others (22)	16,437	11.1	428,831	26.10
Total	148,212	100.0	4,508,583	30.42

The reported cut of hickory lumber in 1906 amounted to 148,212,000 feet, valued at $4,508,583, an average of $30.42 per M. Arkansas is the leading State in hickory production, with 15.8 per cent of the total, followed by Indiana, Kentucky, and Ohio.

The cut of hickory lumber reported in 1906 was more than one-half greater than that reported in 1899, but it does not necessarily follow that there has been an actual increase in hickory production to this extent. It is impossible to obtain absolutely complete figures for this wood. Much hickory is cut by small mills from which it is difficult to get reports. Also a great deal of hickory in the form of spoke and handle stock is sold by the piece instead of by the board foot, and no reports upon such material were received. There is a shortage of available hickory, and some of the best informed consumers of the wood have estimated that at the present rate of consumption the supply will be exhausted in fifteen years.

SUGAR PINE.

The commercial range of sugar pine is restricted to the west side of the Sierras and portions of the Coast Range in California, with a small extension into southern Oregon. Of the total production of 133,640,000 feet, valued at $2,152,662, in 1906, California furnished over 97 per cent. While the cut of sugar pine will never reach large proportions compared with that of many other woods, it is increasing rapidly, and the production reported in 1906 was nearly two and one-half times that in 1899.

TABLE 28.—*Cut of sugar pine, 1906.*

State.	M feet.	Per cent.	Total value.	Value per M feet.
California	130,231	97.4	$2,108,602	$16.19
Oregon	3,409	2.6	44,060	12.92
Total	133,640	100.0	2,152,662	16.11

TAMARACK.

Tamarack, or eastern larch, is cut in the Lake States almost exclusively; the quantity reported from other States is so small as not to justify inclusion in Table 29. The reported cut in 1906 amounted to 123,395,000 feet, valued at $1,926,627, an average of $15.63 per M. Minnesota is the leading State, closely followed by Wisconsin and Michigan. It is probable that the total cut of tamarack is somewhat greater than that reported, as manufacturers frequently do not keep an accurate record of it, and to some extent it is mixed in with other lumber. The Census secured reports upon a production of slightly less than 84 million feet of tamarack in 1899.

TABLE 29.—*Cut of tamarack, 1906.*

State.	M feet.	Per cent.	Total value.	Value per M feet.
Minnesota	47,433	38.4	$771,942	$16.27
Wisconsin	41,757	33.8	629,766	15.08
Michigan	34,205	27.8	524,919	15.35
Total	123,395	100.0	1,926,627	15.63

WHITE FIR.

Only recently has the white fir of the Rocky Mountain and Pacific Coast States been cut to any extent for lumber. The census secured no separate figures upon it in 1899 and 1904. About 52 million feet were reported to the Forest Service in 1905, and double that quantity was reported in 1906. Nearly two-thirds of the white fir cut last year was in California, and most of the remainder in Montana, Idaho, and Washington. While the white fir is not so valuable a timber as the Douglas fir, it is useful for various purposes, and reports of future production will undoubtedly show a strong increase. The average mill values at present range from $10.87 per M in Montana, to $13.45 in California, with an average of $12.91.

TABLE 30.—*Cut of white fir, 1906.*

State.	M feet.	Per cent.	Total value.	Value per M feet.
California	67,769	65.0	$911,474	$13.45
Montana	14,464	13.8	157,186	10.87
Idaho	10,514	10.1	135,735	12.91
Washington	8,131	7.8	100,691	12.38
All others (4)	3,451	3.3	41,217	11.95
Total	104,329	100.0	1,346,303	12.91

WALNUT.

More than one-fourth of the walnut lumber cut in 1906 was sawed in Indiana. Missouri came second with 14.4 per cent, followed by Kentucky, Ohio, Illinois, and Arkansas with nearly equal quantities. The total production was 48,174,000 feet, valued at $2,033,722, or $42.25 per M. The cut of walnut has increased by moderate degrees since 1899, when the production was 38,681,000 feet. Walnut is the highest-priced wood cut for lumber to any considerable extent in the United States. Many of the best walnut logs, however, are exported to Europe, principally to Germany, so that the quantities given in Table 31 do not represent the whole amount of walnut taken from the forests of the country.

TABLE 31.—*Cut of walnut, 1906.*

State.	M feet.	Per cent.	Total value.	Value per M feet.
Indiana	12,924	26.8	$530,408	$41.04
Missouri	6,939	14.4	303,773	43.78
Kentucky	5,546	11.5	212,325	38.28
Ohio	5,479	11.4	245,783	44.86
Illinois	5,097	10.6	170,767	33.50
Arkansas	4,905	10.2	245,110	49.97
Tennessee	4,144	8.6	170,083	41.04
All others (10)	3,140	6.5	155,473	49.52
Total	48,174	100.0	2,033,722	42.25

TUPELO.

Tupelo is another minor wood which has recently come into prominence. The first time the cutting of tupelo lumber was separately given was in 1905, when the Forest Service obtained reports of a production of 35,794,000 feet. The production reported for 1906 was 47,882,000 feet, valued at $676,476, an average of $14.13 per M. Tupelo is closely associated with cypress and is cut by cypress manufacturers chiefly; we find, therefore, that over one-fourth of the total production was in Louisiana, with most of the remainder furnished by North Carolina, Alabama, Virginia, and Mississippi.

TABLE 32.— *Cut of tupelo, 1906.*

State.	M feet.	Per cent.	Total value.	Value per M feet.
Louisiana	12,561	26.3	$200,134	$15.93
North Carolina	7,454	15.6	87,148	11.69
Alabama	5,835	12.2	94,670	16.22
Virginia	5,506	11.5	66,272	12.04
Mississippi	4,170	8.7	61,602	14.77
Arkansas	3,306	6.9	43,613	13.19
Missouri	2,174	4.5	25,958	11.94
Tennessee	2,113	4.4	37,656	17.82
All others (9)	4,763	9.9	59,423	12.47
Total	47,882	100.0	676,476	14.13

TABLE 33.—*Lumber cut of the United States, by States and species, 1906.*

State or Territory.	Number of mills.	Aggregate.	SOFTWOODS.															HARDWOODS.															
			Total soft-woods.	Yellow pine.	Douglas fir.	White pine.	Hemlock.	Spruce.	Western pine.	Cypress.	Redwood.	Cedar.	Larch.	Sugar pine.	Tamarack.	White fir.	All other softwoods.	Total hard-woods.	Oak.	Maple.	Poplar.	Red gum.	Chestnut.	Basswood.	Birch.	Cotton-wood.	Beech.	Elm.	Ash.	Hickory.	Walnut.	Tupelo.	All other hardwoods.	
United States	22,398	*M feet.* 37,550,736	*M feet.* 30,235,245	*M feet.* 11,661,077	*M feet.* 4,969,843	*M feet.* 4,583,727	*M feet.* 3,537,329	*M feet.* 1,644,987	*M feet.* 1,386,777	*M feet.* 839,276	*M feet.* 659,678	*M feet.* 357,845	*M feet.* 166,078	*M feet.* 133,640	*M feet.* 123,395	*M feet.* 104,329	*M feet.* 67,264	*M feet.* 7,315,491	*M feet.* 2,820,393	*M feet.* 882,878	*M feet.* 683,132	*M feet.* 453,678	*M feet.* 407,379	*M feet.* 376,838	*M feet.* 370,432	*M feet.* 263,996	*M feet.* 275,661	*M feet.* 224,795	*M feet.* 214,460	*M feet.* 148,212	*M feet.* 48,174	*M feet.* 47,882	*M feet.* 97,581	
1 Alabama	637	1,009,783	943,374	936,493		961				5,880		40						66,409	32,976		12,270	8,436	1,340			1,330	35	429	2,377	1,360		5,835	21	1
2 Arizona	8	56,960	56,960		374				56,586									280	18													262	2
3 Arkansas	835	1,839,368	1,310,398	1,271,618						38,780								528,970	218,896	2,067	5,234	140,819		550		92,610	500	11,532	20,471	23,364	4,905	3,306	4,616	3
4 California	269	1,348,559	1,348,279		127,149		1,760	1,954	347,249		659,678	12,489		130,231		67,769		280	18													262	4
5 Colorado	138	110,212	108,177		2,007			23,991	81,724							455		2,035							1,307							728	5
6 Connecticut	207	124,880	37,931	1,714		25,611	9,196	1,165				205					40	86,949	23,817	2,913	82		49,750	1,240	2,132		1,507	521	2,118	2,829			40	6
7 Delaware	85	44,487	36,197	33,990		1,900				56		251						8,290	4,233	365	25	50	338				326		3	116			2,834	7
8 Florida	278	888,127	885,838	800,844						82,834		2,160						2,299	68		128	284				805			370	553		83	8	8
9 Georgia	622	831,675	794,165	761,842		6,135	280			15,908								47,510	24,050		15,106	1,508	2,643	35		490		144	867	1,213		1,104	250	9
10 Idaho	198	418,944	415,561		34,670	84,314	4,019	4,428	210,305			27,736	39,575			10,514		3,383		336						2,917							130	10
11 Illinois	365	141,374	14,105			10,384	350			3,371								127,269	70,767	4,819	1,195	9,878	50	434	7	6,153	559	12,699	1,781	8,602	5,097	177	5,051	11
12 Indian Territory	50	48,694	28,553	28,553														20,141	5,405			1,155				9,352			1,597	15			2,191	12
13 Indiana	820	447,808	1,360			544	216			300							300	446,448	221,120	29,555	25,234	21,036	2,306	8,547		3,765	31,501	34,580	19,631	21,931	12,924		14,318	13
14 Iowa	78	163,747	144,296			140,909	3,087										300	19,451	6,359	2,113				1,435	112	3,193		4,234	848	20	107		1,030	14
15 Kentucky	991	661,299	46,043	7,927		10,717	21,449	2,711		3,034		205						615,256	339,829	5,058	160,123	26,728	24,865	9,436		1,248	5,002	3,994	8,909	19,134	5,546	715	4,579	15
16 Louisiana	424	2,796,395	2,693,711	2,120,615						573,096								102,684	17,283		2,835	12,855		11		52,672		302	3,382	276		12,561	507	16
17 Maine	734	1,088,747	1,015,591	3,867		291,663	118,294	557,975				15,100					28,692	73,156	16,301	8,107	591		350	4,485	30,533		10,449	623	1,667	50				17
18 Maryland	222	219,098	109,575	63,870		2,852	34,722	6,841		1,290								109,523	64,929	9,934	2,299	2,588	19,752	1,674	2,512		3,379	58	804	1,115	38	200	241	18
19 Massachusetts	485	354,483	292,213	2,895		230,763	31,271	26,068				406					810	62,270	14,042	5,894	10		30,325	1,186	3,629		4,010	322	2,017	699			136	19
20 Michigan	774	2,094,279	1,311,038			435,211	797,883	15,589				24,265			34,205		3,885	783,241	27,647	492,845	2,681			73,458	55,949	141	76,281	29,261	24,400				478	20
21 Minnesota	318	1,794,144	1,765,073			1,664,734	3,744	27,682				1,656			47,433		19,824	29,071	7,302	1,117	811			10,743	3,364		455	2,555	2,724					21
22 Mississippi	642	1,840,250	1,554,082	1,509,554						44,528								286,168	119,370	110	7,070	73,412				59,840		3,703	8,850	6,247		4,170	3,396	22
23 Missouri	587	507,084	192,991	176,526						16,465								314,093	143,608	4,564	2,368	95,184		230	9	9,353	50	15,251	7,972	10,630	6,939	2,174	15,761	23
24 Montana	84	328,727	323,643		41,537	5,850	235	4,025	165,849			195	91,488			14,464		5,084								200							4,884	24
25 Nebraska		(a)																																25
26 Nevada		(a)																																26
27 New Hampshire	552	539,259	479,550	977		332,319	54,858	90,156				87					1,153	59,709	16,023	8,624	108		5,676	2,355	15,605		8,087	290	2,824	117				27
28 New Jersey	139	36,253	17,588	12,963		687	1,498	356				2,084				461		18,665	9,325	461	100	293	6,122	414	185		351	94	115	1,199	6			28
29 New Mexico	33	103,079	103,079		9,398	1,397,923		1,174	92,467							40																	29
30 New York	2,488	810,949	531,348			111,260	208,848	210,123									427	279,601	24,116	60,566			22,696	28,850	50,142		39,738	19,855	15,585			18,053	30
31 North Carolina	1,210	1,222,974	995,406	899,042		39,637	28,727	2,058		21,710		4,232						227,568	107,262	250	58,080	8,598	34,707	2,029	2	598	4	187	4,769	1	7,454	1,838	31
32 Ohio	688	438,775	5,973	210		319	1,524	3,920										432,802	244,673	23,071	58,358	810	7,876	12,718		1,414	8,904	29,058	21,359	15,836	5,479	489	2,757	32
33 Oregon	557	1,604,894	6,971		1,347,467		9,847	78,652	131,460			20,481	3,766	3,409		2,841		6,971	972	1,481						1,377			1,516			1,625	33
34 Pennsylvania	1,493	1,620,881	1,100,719	34,063		96,564	966,480	2,428				902					282	520,162	243,110	75,081	5,304		73,096	17,932	25,583		53,892	5,635	9,484	9,389	342		1,314	34
35 Rhode Island	31	21,528	13,638	362		12,891	380					5						7,890	2,087	217			4,868		28		19	74	340	347			10	35
36 South Carolina	296	566,928	548,696	527,240		33	55			21,368								18,232	3,420		2,972	6,912	100			1,277		51	1,436	25		1,839		36
37 South Dakota	40	22,634	22,534						22,534									100														100	37
38 Tennessee	684	634,587	99,472	39,198		28,600	23,666	481		3,022		4,505						535,115	274,974	3,229	127,881	35,250	40,182	8,274		7,478	603	4,513	12,404	11,996	4,144	2,113	2,074	38
39 Texas	322	1,741,473	1,720,784	1,720,043						741								20,689	10,788			2,978		1		3,724		20	2,824	51		51	252	39
40 Utah	57	7,768	7,697		681	1,545		1,273	3,737							115	346	71								71								40
41 Vermont	514	329,422	226,049	1,603		24,944	56,042	136,867				213					6,380	103,373	6,165	34,859	915		346	9,482	29,577		14,976	1,759	5,184	53			57	41
42 Virginia	1,202	1,063,241	796,045	703,598		33,784	22,029	29,496		6,893		245						267,196	158,456	149	61,344	4,166	27,869	1,684		1,303	64	426	2,362	2,973	322	5,506	572	42
43 Washington	923	4,305,053	4,304,268		3,405,510	23,415	90,002	243,493	265,820			236,648	31,249			8,131		785		75						699			11					43
44 West Virginia	652	976,173	414,585	1,470		31,322	219,959	161,834										561,588	314,961	20,278	129,652	738	52,122	17,480		571	7,538	308	4,895	4,646	1,094	105	7,200	44
45 Wisconsin	625	2,331,305	1,817,744			933,169	826,908	9,670				3,735			41,757		2,505	513,561	45,996	84,740	356			162,155	151,063	78	7,431	42,136	19,386	5	215			45
46 Wyoming	49	13,213	12,993		1,050			577	9,046								2,320	220														220	46
47 All others (Kansas and Oklahoma)	3	1,213																1,213															47

a None reported.

TABLE 34.—*Average mill value of lumber by States and species, 1906.*

	State.	Average value per M feet.																										
		All species.	Yellow pine.	Douglas fir.	White pine.	Hemlock.	Spruce.	Western pine.	Cypress.	Red-wood.	Cedar.	Larch.	Sugar pine.	Tama-rack.	White fir.	Oak.	Maple.	Poplar.	Red gum.	Chest-nut.	Bass-wood.	Birch.	Cotton-wood.	Beech.	Elm.	Ash.	Hick-ory.	Walnut.	Tupelo.
1	Alabama	$15.55	$15.24													$22.35		$19.72	$13.51									$16.22
2	Arizona	15.38						$15.42																				
3	Arkansas	16.12	14.75						$17.73							20.05			12.60			$19.59		$14.57	$28.38	$38.62	$49.97	13.19
4	California	15.37		$13.27				13.90		$16.64	$13.12		$16.19		$13.45													
5	Colorado	12.33					$13.19	12.09																				
6	Connecticut	18.42			$17.31											22.28				$17.92								
7	Delaware	12.26																										
8	Florida	17.50	16.63						24.35																			
9	Georgia	15.38	15.02						23.63							16.83		19.67										
10	Idaho	14.24		13.14	15.73			14.65			12.49	$11.75			12.91													
11	Illinois	21.74														22.64			13.86			16.74		17.10		29.70	33.50	
12	Indian Territory	13.05																				12.44						
13	Indiana	24.66														26.88	$17.77	29.03	14.84		$20.98							
14	Iowa	22.74			23.26																							
15	Kentucky	19.92				$12.64										19.62		23.31	14.18	16.37	17.93			14.28	23.51	25.05	38.28	
16	Louisiana	16.61	15.05						22.42										17.54				14.49					15.93
17	Maine	16.87			16.45	14.76	17.57				17.11																	
18	Maryland	17.14	13.42			15.69										21.47				17.44		$19.22		15.53				
19	Massachusetts	15.54			14.70	14.88	17.90													17.26								
20	Michigan	15.93			21.22	13.40					17.57			$15.35		24.27	14.40				19.02	17.44		11.96	18.51	20.37		
21	Minnesota	17.41			17.46		17.88							16.27							16.53							
22	Mississippi	16.81	16.16						19.80							24.23			13.60				16.42		25.06	42.35		14.77
23	Missouri	15.83	12.26						16.43							19.24			12.75				17.18	15.32	29.20	29.48	43.78	11.94
24	Montana	13.18		12.28				14.23				11.98			10.87													
25	New Hampshire	15.50			14.89	14.85	17.84															15.78		13.35				
26	New Jersey	25.42																										
27	New Mexico	18.78						19.18																				
28	New York	21.26			22.00	19.00	20.50									30.00	25.50			19.00	24.00	23.00		17.50	25.00	24.00	28.00	
29	North Carolina	15.59	13.80		17.56	13.14			19.14							22.02		23.14	13.26	19.14					26.48			11.69
30	Ohio	24.13														23.97	16.57	29.28			18.97			14.85	18.64	29.50	30.42	44.86	
31	Oregon	13.93		14.00			15.11	12.20			16.07	13.02	12.92															
32	Pennsylvania	18.39			24.06	17.16										22.33	16.27			17.36	18.81	17.55		13.34	17.98	25.33	27.10	
33	Rhode Island	17.52																										
34	South Carolina	15.80	15.65						20.64																			
35	South Dakota	15.87						15.87																				
36	Tennessee	21.25			18.95	13.99										22.76		23.66	16.30	16.41	19.51		20.14		15.59	26.43	28.90	41.04	17.82
37	Texas	14.99	14.95																									
38	Utah	15.21																										
39	Vermont	16.61			17.39	16.51	17.29										15.21				16.27	15.35		13.75		20.46		
40	Virginia	15.22	13.23		15.69	14.49	17.48									19.92		23.11		17.08								12.04
41	Washington	14.44		14.34	16.72	12.23	14.61	12.71			18.66	11.81			12.38													
42	West Virginia	18.69			18.98	16.12	18.13									19.01	12.89	24.92		15.83	18.34			10.57			20.88	
43	Wisconsin	17.16			19.80	14.43								15.08		23.76	13.85				17.82	15.45		13.87	17.10	18.80		
	Average	16.60	15.02	14.20	18.32	15.31	17.33	14.01	21.94	16.64	18.12	11.91	16.11	15.63	12.91	21.76	15.53	24.21	13.46	17.49	18.66	17.24	17.15	14.05	18.08	24.35	30.42	42.25	14.13

LUMBER PRODUCTION BY STATES.

The quantity and the average value per M of the lumber production of the United States in 1906, by States and species, together with the number of mills reporting from each State, are shown in Tables 33 and 34. Nearly all of the figures given in these two tables are found in the preceding tables for individual species, but they are here brought together in order that the totals and averages for the various States may be readily compared. In 1906 the following States led in the production of the kinds of lumber specified:

Arkansas: Red gum, cottonwood, hickory.
California: Redwood, western pine, sugar pine, white fir.
Indiana: Walnut.
Kentucky: Oak, poplar.
Louisiana: Yellow pine, cypress, tupelo.
Maine: Spruce.
Michigan: Maple, beech, ash.
Minnesota: White pine, tamarack.
Montana: Larch.
Pennsylvania: Hemlock, chestnut.
Washington: Douglas fir, cedar.
Wisconsin: Basswood, birch, elm.

SHINGLES.

The production of shingles, by species, in 1906 is shown in Table 35; the total number was 11,858,260,000, valued at $24,154,555, an average of $2.04 per M.

TABLE 35.—*Production of shingles, by species, 1906.*

Kind.	Thousands.	Per cent.	Total value.	Value per M.
Cedar	8,735,699	73.5	$17,113,873	$1.96
Cypress	1,235,721	10.4	3,071,866	2.49
Redwood	819,770	6.9	1,333,431	1.62
Yellow pine	553,486	4.9	1,340,858	2.42
White pine	226,214	1.9	488,962	2.16
Hemlock	131,157	1.1	357,867	2.73
Spruce	62,880	.5	157,012	2.50
Chestnut	32,544	.3	122,047	3.75
Oak	24,034	.2	76,051	3.16
All others	36,755	.3	92,588	2.52
Total	11,858,260	100.0	24,154,555	2.04

Shingles are made to some extent from a large number of woods, but the several varieties of cedar furnished nearly three-fourths of the total quantity. Some cedar shingles are made in the New England and northeastern States, and a considerable number in the Lake States, but a very large proportion of the cedar shingles are cut in

Washington from the giant arborvitæ, the so-called "red cedar" of that region. Another species of the same genus is the arborvitæ or "white cedar" of the Lake States. Owing to unsatisfactory market conditions early in the year, and later to inadequate shipping facilities, the shingle production of Washington was somewhat curtailed in 1906 and fell below that in 1905.

Cypress is the next wood in importance in point of shingle production, and furnished one-tenth of the total cut in 1906. The making of cypress shingles, however, is beginning to decrease, as some of the manufacturers are finding it more profitable to work into other forms the material which formerly went into shingles.

Over 800,000,000 redwood shingles were cut in 1906, and their production is increasing. The production of yellow pine shingles has fallen off since 1899, and that of white pine shingles has decreased still more heavily; in fact, the cut of white pine shingles in 1906 was less than one-eighth of that in 1899. The only important kinds of shingles which show any increase in production are cedar and redwood, and they are coming to occupy more and more a predominating position in the shingle-making industry.

As is the case with the various kinds of lumber, the mill values of shingles have risen during the past few years; the average value of the cut in 1899 was $1.56 per M, as against $2.04 in 1906.

The shingle production by States in 1906 is shown by Table 36. The relative prominence of each Stte in the industry is due to the presence of one or more of the shingle woods mentioned in the preceding paragraphs. Because of the great quantities of cedar which it contains, Washington is far in the lead, and the cut there last year was over three-fifths of the whole. Michigan, Louisiana, and California rank nearly together, with averages of from 7.7 to 7 per cent. The Michigan shingles are mostly cedar, those of Louisiana cypress and yellow pine, and those of California redwood.

TABLE 36.—*Production of shingles, by States, 1906.*

State.	Thousands.	Per cent.	Total value.	Value per M.
Washington	7,286,508	61.5	$13,834,016	$1.90
Michigan	915,153	7.7	1,962,184	2.14
Louisiana	866,597	7.3	2,005,990	2.31
California	834,329	7.0	1,368,051	1.64
Maine	340,948	2.9	743,097	2.18
Wisconsin	302,876	2.5	703,973	2.32
Arkansas	228,563	1.9	498,149	2.18
Florida	175,720	1.5	562,835	3.20
Georgia	161,339	1.4	392,038	2.43
All others	746,227	6.3	2,084,222	2.79
Total	11,858,260	100.0	24,154,555	2.04

LATH.

Lath are so generally a by-product of lumber manufacture that they are cut to some extent from almost every wood which is made into lumber, though the order of the various woods in point of importance as a source of lath production does not correspond to their rank in lumber production. The total production of lath in 1906 was 3,812,807,000, valued at $11,490,570, an average of $3.01 per M.

TABLE 37.—*Production of lath, by species, 1906.*

Kind.	Thousands.	Per cent.	Total value.	Value per M.
White pine	933,481	24.4	$3,216,376	$3.45
Yellow pine	767,701	20.2	2,047,740	2.67
Hemlock	619,160	16.2	2,029,864	3.28
Douglas fir	551,020	14.4	1,126,601	2.04
Spruce	430,345	11.3	1,325,097	3.08
Cypress	180,271	4.7	620,587	3.44
Oak	58,497	1.5	226,503	3.88
Cedar	47,955	1.3	169,223	3.53
Basswood	40,883	1.1	144,134	3.53
Poplar	31,839	.9	115,931	3.64
Chestnut	21,934	.6	73,425	3.35
Ash	20,133	.5	65,854	3.27
All others	109,588	2.9	329,235	3.00
Total	3,812,807	100.0	11,490,570	3.01

White pine furnished nearly one-fourth of the total, yellow pine one-fifth, hemlock 16.2 per cent, Douglas fir 14.4 per cent, spruce 11.3 per cent, and cypress 4.7 per cent. These six species supplied more than nine-tenths of the total. The census did not report the lath production by species in 1899, so no comparisons along this line are possible. The average value of the lath produced in that year, however, was but $1.86 per M, as against an average of $3.01 per M in 1906.

The production of lath, by States, in 1906 is given in Table 38. Minnesota, Washington, and Wisconsin lead, with from 12 to 13.2 per cent each. Next come Louisiana, Maine, and Michigan, with between 8 and 9 per cent apiece. These six States furnish nearly two-thirds of the whole quantity.

TABLE 38.—*Production of lath, by States, 1906.*

State.	Thousands.	Per cent.	Total value.	Value per M.
Minnesota	501,673	13.2	$1,763,655	$3.52
Washington	479,187	12.5	1,028,307	2.15
Wisconsin	457,880	12.0	1,334,866	2.92
Louisiana	348,530	9.1	1,011,143	2.90
Maine	329,549	8.7	1,005,459	3.05
Michigan	317,395	8.3	1,119,630	3.53
Pennsylvania	200,494	5.3	765,289	3.82
Oregon	156,973	4.1	338,636	2.16
West Virginia	137,506	3.6	507,422	3.69
All others	883,626	23.2	2,616,163	2.96
Total	3,812,807	100.0	11,490,570	3.01

KILN-DRYING.

The quantity of lumber reported as kiln-dried by the manufacturers in 1906 is shown by States in Table 39. It is not practicable to give accurate figures upon the quantity by species.

TABLE 39.—*Quantity of lumber kiln-dried by lumber manufacturers, 1906.*

State.	M feet.	Per cent of total cut of State.	State.	M feet.	Per cent of total cut of State.
Alabama	79,228	7.9	Missouri	34,617	6.8
Arizona	3,994	7.0	Montana	13,830	4.2
Arkansas	514,211	27.9	New Hampshire	21,139	3.9
California	109,118	8.1	New Mexico	12,817	12.4
Colorado	3,280	3.0	North Carolina	375,639	30.6
Connecticut	1,128	.9	Ohio	17,548	4.0
Delaware	612	13.7	Oregon	185,972	11.6
Florida	178,587	20.1	Pennsylvania	29,685	1.8
Georgia	165,855	20.0	South Carolina	201,668	35.4
Idaho	24,048	5.7	Texas	432,329	24.8
Illinois	767	.5	Tennessee	32,195	5.1
Indian Territory	2,008	4.1	Vermont	24,221	7.3
Indiana	12,698	2.8	Virginia	200,331	18.8
Kentucky	19,808	3.0	Washington	575,501	13.4
Louisiana	746,853	26.7	West Virginia	14,798	1.5
Maine	11,541	1.1	Wisconsin	74,991	3.2
Maryland	978	.4	All others (Iowa, New Jersey, Rhode Island, Utah, Wyoming)	409	.2
Massachusetts	7,029	2.0			
Michigan	94,976	4.5			
Minnesota	9,745	.5			
Mississippi	415,873	22.6	Total	4,650,027	12.4

Yellow pine is the wood most largely kiln-dried, as it dries very readily and the shipping weight is thus reduced. In many cases, also, this process improves the quality of the lumber by preventing stain. The fact that yellow pine is the principal wood kiln-dried is indicated by the table, in which it will be noted that every State which shows a high percentage of lumber kiln-dried is a prominent yellow pine producing State. The proportion in South Carolina, for instance, is 35.4 per cent. Considerable Douglas fir is also kiln-dried—11.6 per cent of the cut of Oregon lumber and 13.4 per cent of that of Washington in 1906. On the other hand, but little hardwood lumber is kiln-dried by sawmill operators, and it will be noted from the table that no State which is prominent in hardwood production shows a large amount of lumber kiln-dried. For the entire country the proportion of the total cut kiln-dried by lumber manufacturers is 12.4 per cent.

SURFACING.

The quantity and proportion of the total cut of lumber surfaced by the manufacturers in 1906 is given by States in Table 40. In this case, as with kiln-drying, it is not practicable to state the exact amounts surfaced by species. The coniferous woods, however, are most largely surfaced by sawmill operators.

TABLE 40.—*Quantity of lumber surfaced by lumber manufacturers, 1906.*

State.	M feet.	Per cent of total cut of State.	State.	M feet.	Per cent of total cut of State.
Alabama	84,074	8.4	Missouri	119,273	23.5
Arizona	19,464	34.2	Montana	164,930	50.2
Arkansas	919,677	50.0	New Hampshire	98,187	18.2
California	348,345	25.8	New Jersey	2,945	8.1
Colorado	40,576	36.8	New Mexico	59,610	57.0
Connecticut	4,726	3.8	North Carolina	221,705	18.1
Delaware	7,049	15.8	Ohio	47,355	10.8
Florida	156,539	17.6	Oregon	573,760	35.7
Georgia	162,954	19.6	Pennsylvania	194,688	12.0
Idaho	206,639	45.4	South Carolina	100,433	17.7
Illinois	12,598	24.1	Texas	1,038,331	59.5
Indian Territory	11,752	46.6	Tennessee	76,738	12.1
Indiana	25,480	8.9	Vermont	130,714	39.7
Iowa	76,259	5.7	Virginia	168,108	15.9
Kentucky	119,917	18.1	Washington	1,353,849	31.4
Louisiana	1,519,621	54.4	West Virginia	139,949	14.3
Maine	205,947	18.9	Wisconsin	934,223	40.1
Maryland	21,046	9.6	Wyoming	3,574	27.0
Massachusetts	79,949	22.5	All others (Rhode Island and Utah)	1,366	4.7
Michigan	317,396	15.1			
Minnesota	796,219	44.4	Total	11,077,238	30.0
Mississippi	511,273	27.8			

Since large establishments are likely to turn out a more finished product, the greatest proportion of lumber surfaced is in States where large mills cutting coniferous woods are common, and a small proportion is surfaced where the cut is mostly hardwoods, by small and portable mills; in Texas, for instance, 59.5 per cent of the total quantity of lumber manufactured last year was surfaced at the mills, while in Connecticut but 3.8 per cent of the cut was so handled. For the entire country 30 per cent of the lumber production was surfaced by the manufacturers.

STOCK ON HAND.

LUMBER.

The quantity of lumber reported as being in the hands of the manufacturers on January 1, 1907, together with the percentage of the total quantity cut in 1906, which this represents, is given in Table 41. The range is from 10.7 per cent with spruce to 50.1 per cent with cypress. Many factors are to be considered in explaining these wide variations, such as the time required for seasoning different species under different conditions, market conditions, shipping facilities, ability of manufacturers to carry large stocks, etc. For the entire country the quantity of lumber in the hands of the manufacturers on January 1, 1907, was equivalent to 21.6 per cent of the 1906 production.

TABLE 41.—*Lumber on hand January 1, 1907, by species.*

Kind.	M feet.	Per cent of 1906 cut.	Kind.	M feet.	Per cent of 1906 cut.
Cypress	420,620	50.1	Beech	44,532	16.2
White pine	1,618,273	35.3	Yellow pine	2,124,953	18.2
Birch	104,909	28.3	Chestnut	68,839	16.9
Western pine	426,246	30.7	Cedar	62,352	17.4
Red gum	134,411	29.6	Ash	34,330	16.0
Maple	239,740	27.2	Oak	458,309	16.2
Hemlock	940,657	26.6	Douglas fir	633,052	12.7
Cottonwood	65,872	24.9	Spruce	175,509	10.7
Redwood	147,338	22.3	All others	176,649	10.7
Elm	41,990	18.7			
Poplar	136,738	20.0	Total	8,121,005	21.6
Basswood	65,686	17.4			

SHINGLES.

The reported quantities of shingles in the hands of the manufacturers on January 1, 1907, is shown in Table 42. It is unusual for shingle manufacturers to carry very heavy stocks, and it will be noted that, for the country as a whole, the stocks on hand represented a little more that one-tenth of the previous year's cut.

TABLE 42.—*Shingles on hand January 1, 1907, by species.*

Species.	Thousands.	Per cent of 1906 cut.	Species.	Thousands.	Per cent of 1906 cut.
Cedar	898,109	10.3	Spruce	5,578	8.8
Cypress	133,818	10.8	Chestnut	8,676	26.6
Redwood	108,669	13.3	All others	14,840	40.4
Yellow pine	48,455	8.8			
White pine	36,250	16.0	Total	1,286,070	10.9
Hemlock	31,675	24.1			

STUMPAGE VALUES.

The question of stumpage values is of so much interest that early in 1907 the Forest Service secured reports from a large number of the leading lumber manufacturers on their respective localities. The figures obtained as a result of this canvass are given in the third column of Table 43. They are based on more than 1,500 reports, and so may be considered representative.

TABLE 43.—*Comparison of stumpage values, 1899, 1904, 1907.*

Kind.	Average value per M feet.			Kind.	Average value per M feet.		
	1899	1904	1907		1899	1904	1907
White pine	$3.66	$4.62	**$8.09**	Birch	.....	.....	**$4.40**
Ash	3.03	3.95	**7.58**	Cypress	$1.58	$3.42	**4.37**
Basswood	1.50	3.89	**6.79**	Cottonwood	1.45	2.61	**3.97**
Hickory	.....	.....	**6.69**	Beech	.....	.....	**3.56**
Oak	[a] 3.18	3.83	**6.52**	Yellow pine	1.12	1.68	**3.16**
Spruce	2.26	3.70	[b] **5.49**	Maple	2.66	3.82	**2.50**
Chestnut	2.71	3.39	**4.97**	Red gum	1.68	1.67	**2.46**
Elm	3.30	5.58	**4.94**	Redwood	1.06	1.55	**2.35**
Poplar	2.81	3.89	**4.64**	Western pine	.....	.....	**1.66**
Cedar	1.32	1.49	**4.63**	Douglas fir	.77	1.05	**1.44**
Hemlock	2.56	3.51	[c] **4.51**	Tupelo	.....	.....	**1.27**

[a] White oak only. [b] Eastern spruce only. [c] Eastern hemlock only.

The main factors which influence the stumpage price of any species in a given locality are quantity, quality, market conditions, and accessibility, but it is difficult to determine which of these has the most weight in fixing the average stumpage value for a species over its entire range. In the Rocky Mountain and Pacific coast regions the roughness of the land contributes the element of inaccessibility to lower the stumpage value. In the more densely settled hardwood sections of the Central States this difficulty is less and the amount of timber standing on a tract, and its quality, are likely to exert the principal influence. Mill values for hardwood are, in general, higher than those for softwoods, and this affects stumpage prices, though there are notable exceptions to the rule, such as white pine, a softwood, and red gum, a hardwood. In accordance with the general law of supply and demand, relatively high stumpage values obtain with those woods the virgin supplies of which are most nearly exhausted or which have passed largely into the possession of a few owners. It will be noted in this connection that the highest average value, $8.09 per M, was reported for white pine, and the next to the lowest, $1.44 per M, for Douglas fir. In general it is true that decidedly higher stumpage values obtain in the Northern and Eastern States than in the Southern and Western States.

For purposes of comparison, the average stumpage values given by the census for 1899 and 1904 are also shown in Table 43. It will be noted that almost without exception the 1904 values exceed those of 1899, and that the 1907 values are nearly all much in excess of those of 1904. Brief mention will be made of the values reported for the several species in different localities and under varying conditions.

WHITE PINE.

The average stumpage value of $8.09 given for white pine is based upon 400 reports from 19 States. The average State values run from $1.56 in Alabama to $11.51 in Wisconsin. The quotations from New England and the Middle Atlantic States are considerably higher than those from farther south in the Appalachian region. The maximum value of white pine stumpage, $20 per M, is reported from the farming counties of New York, northwest and central Pennsylvania, and northern Wisconsin. In Michigan, the quotations extend from $5 to $18, with an average of $10.73 for the lower peninsula and $11 for the upper. In Minnesota the range reported is from $5 to $12, with an average of $7.58. The rise in white pine stumpage has been very rapid. The census quotations gave $3.66 in 1899 and $4.62 in 1904.

ASH.

Seven hundred and fifty reports upon the value of ash stumpage in 35 States resulted in an average of $7.58 per M. Eliminating California, Washington, Indian Territory, Georgia, Rhode Island, and New Jersey, where ash is relatively unimportant and from which few reports were received, the range in average State values was from $3.15 per M in Oregon to $15.11 in Indiana. The highest average values, $18 and $19 per M, were reported from northern and central Indiana and northwestern Ohio. On the other hand, the average of the reports from the Mississippi Valley section of Arkansas was but little more than $4 per M, and from the Mississippi Valley portion of Mississippi, $5.43 per M.

BASSWOOD.

Four hundred and fifty-eight reports upon the value of basswood stumpage in 21 States gave an average of $6.79 per M. Prices in individual States varied between 88 cents in Arkansas and $10.83 in Indiana. As is the case with other hardwoods, the lower stumpage values are found in the Southern States and most of the quotations for basswood in this region are under $4 per M against quotations of $6 and upward in most of the Northern States. In Wisconsin, the most important State in the production of basswood lumber, stumpage quotations ran from $3 to $15 per M, with an average of $6.59, and similar conditions obtain in Michigan, the second State in importance.

HICKORY.

Five hundred and forty reports from 24 States gave an average value of $6.69 for hickory stumpage. State averages ranged from $3.17 for Alabama to $15.75 for New York. In Arkansas, the most important hickory-producing State, quotations ran from 50 cents to $10 per M; and in Indiana, the second State, from $1.75 to $30 per M. The highest individual reports came from the farming counties of New York, western Massachusetts, Ohio, and Indiana, and the lowest from the southwest and central sections of Arkansas.

OAK.

More than 1,700 reports upon the value of oak stumpage resulted in an average of $6.52 per M. With white oak the values ranged from $1.08 in Indian Territory to $16.30 in Indiana; the highest quotations came from western Kentucky, central and southern Indiana, and New York. In Kentucky and Indiana the high values are due to the unusually fine quality and limited supply, while the nearness to ready markets caused the maximum price of $30 per M in

New York. Quotations of $20 per M for white oak stumpage were received from Vermont, Massachusetts, Pennsylvania, New Jersey, Wisconsin, Ohio, and Indiana. The maximum quotation for red oak stumpage was $20 in Pennsylvania, Michigan, Wisconsin, and Indiana. On the other hand, from the Southern States many quotations of $1 per M for red oak were received, and some as low as 50 cents. In Kentucky, which is now the leading State in the production of oak lumber, the average stumpage values reported for white oak were $3.05 in the eastern part of the State, $6.26 in the central and $9.62 in the western. For the same sections of Kentucky, the average quotations on red oak stumpage were $2.40, $4.56, and $6.87. In West Virginia, the second most important oak-producing State, the average quotations for both kinds ran from $4 to $5 per M.

SPRUCE.

Two hundred and sixty-seven reports upon the value of eastern spruce stumpage were received from 16 States. Most of the reports, however, came from New England and the Lake States, and a few from the Southern Appalachian region. The average for the whole country was $5.49 per M. That for northern Maine was $5.14 per M, and that for the southern part of the State $6.02. Average values of $6.07 per M were reported from New Hampshire, $5.87 from Vermont, and $4.67 from the Adirondack counties of New York. The average price reported from West Virginia is $4.63 per M, from the upper peninsula of Michigan $5.02, and from the lower peninsula $5.40. The maximum quotations from Wisconsin and Minnesota are $10 per M, with an average of $6.16 in the former State and of $5.47 in the latter.

Quotations of spruce stumpage values range from $1 to $5 per M in Washington to $3 in Oregon and to $2.50 in Colorado and Idaho.

CHESTNUT.

Three hundred and sixty-five reports upon the value of chestnut stumpage in 18 States gave an average of $4.97 per M. State quotations ran from $1.86 in Georgia to $9.43 in New Jersey; the average value for 11 States ranged between $4 and $8 per M. Practically all the average values for the Southern States were below $4 per M and of the northern States above $5. In Pennsylvania, the leading State in point of chestnut production, extreme quotations were $2 and $20 per M; the average for the central portion was $5.34 and for the northwestern $8.09. In West Virginia the average quotation in the eastern part of the State was $2.81 per M and in the western $3.35. Slightly higher values held in Kentucky and Tennessee.

ELM.

An average value of $4.94 for elm stumpage was obtained from 496 reports from 23 States. The State averages ranged from $1 in Louisiana to $9.64 in Indiana; though the reports from the former State were too few to be satisfactory. Quotations of $15 per M for elm stumpage are not unusual in the Northern States; the average for the lower peninsula of Michigan is $8.34 per M and for northern Indiana $10. On the other hand, quotations in excess of $3 in the Southern States are infrequent. In Arkansas, the most prominent southern State in the production of elm lumber, quotations run from 50 cents to $3 per M; while in Wisconsin reports upon soft elm run from $2 to $5 and those upon rock elm $3 to $15.

POPLAR.

Four hundred and forty-eight reports from 16 States upon the value of poplar stumpage gave an average of $4.64 per M. The State quotations ran from $3.43 per M in Georgia to $18.64 in Indiana. In nearly all the Southern States the average stumpage reported for poplar was under $5 per M; in the States farther north it was over $8 per M. It is especially interesting to note that the average stumpage values reported for poplar are higher than those for white oak in all but seven States, and that in Illinois and Virginia they are only a few cents lower. The highest individual reports upon poplar stumpage come from Indiana and western Kentucky.

CEDAR.

The average price reported for cedar stumpage, based upon 322 quotations from 17 States, was $4.63 per M. In Washington, which is by far the most important State for cedar, the reports ran from 50 cents to $5 per M, with an average of $1.86 for the Puget Sound and coast counties. Practically the same average value was reported from northern Idaho. In Michigan the quotations ranged from 50 cents to $10 per M, with an average of $3.43 for the upper peninsula and $5.02 for the lower. In Maine the range was from $2 to $10 per M, with an average of $3.88 for the northern portion of the State and $4.65 for the southern. In Florida quotations for pencil cedar ran as high as $60 per M. This cedar, of course, is an entirely different species from those of the northern and western States.

HEMLOCK.

Eastern hemlock stumpage has an average value of $4.51 per M, according to 462 reports from 16 States. In Pennsylvania, the most

important hemlock-producing State, stumpage quotations ran from $1.50 to $18 per M, with an average of $6.18 in the central part of the State, $9.10 in the northeastern part, and $9.57 in the northwestern. In Wisconsin the value of hemlock stumpage, according to the reports, ran from $1 to $7 per M, with an average of $3.31. The range in Michigan was from $1.50 to $10, with an average of $2.85 for the upper peninsula and $4.73 for the lower. The West Virginia quotations ran from $1.50 to $7 per M, with an average practically the same as in Wisconsin. The few reports upon western hemlock received from Oregon and Washington ranged from 25 cents to $3 per M.

BIRCH.

The average value of birch stumpage, based upon 420 reports from 18 States, was $4.40 per M. The range in State averages was from $2 in Alabama to $6.50 in Indiana, with half of them between $3.50 and $5. In Wisconsin, which produces two-fifths of the birch lumber annually manufactured, the range in birch stumpage quotations was from $1 to $12, with an average of $3.94. Michigan reported the same extremes, with an average of $3.24 for the upper peninsula and $5.49 for the lower. The range in the Adirondack counties of New York was from $1 to $10 per M, with an average of $4.58. In Maine the range was from $2 to $10 per M, with an average of $3.33 for the northern part of the State and $5.75 for the southern. In eastern West Virginia 20 reports gave a range from $1 to $5 per M, with an average of $2.60.

CYPRESS.

The average value of cypress stumpage, based upon 200 reports, was $4.37 per M. In Louisiana the extreme quotations were $2 and $10 per M, with an average of $4.65 for the southeastern portion of the State, which may be considered fairly representative. In Florida stumpage prices ranged from $1.50 to $12, with an average of $4.14; and in the Mississippi Valley section of Mississippi, from $2 to $5, with an average of $3.69.

COTTONWOOD.

Two hundred and twenty-one reports gave the average value of cottonwood stumpage as $3.97 per M. State averages ran from $1.57 in Idaho to $11.64 in Ohio. In the Mississippi Valley section of Arkansas, the largest cottonwood-producing section of the United States, quotations ran from $1 to $7 per M, with an average of $2.91. In the same relative situation in Mississippi the ranges were from $1

to $4 per M, with an average of $2.39, and similar prices were quoted from northern Louisiana.

It is interesting to note that 15 quotations of cottonwood stumpage prices in the State of Washington ranged from 25 cents to $2.50 per M, and that in one case a price of $3 per M was reported from Oregon.

BEECH.

The average value of beech stumpage, based upon 481 reports from 20 States, was $3.56 per M; the State averages ranged from $1.54 in Georgia to $6.10 in Indiana. In the lower peninsula of Michigan, the leading region for beech production, the quoted prices ran from $1 to $6 per M, with an average of $2.89. In central Pennsylvania, another important beech-producing region, the reports ranged from $1 to $10 per M, with an average of $3.83. The New York quotations closely followed those of Pennsylvania. The average prices of Indiana, which ranks next in importance, were somewhat higher—$4.89 for the southern part of the State, $6.30 for the central part, and $8.09 for the northern.

YELLOW PINE.

Nearly 600 reports upon the value of yellow pine stumpage gave an average of $3.16 per M, nearly three times that given by the census for 1899. The reports upon longleaf yellow pine, the most important of the yellow pine group, ranged from $1.50 to $5 in Florida and Georgia, and from $2.50 to $5.40 in southern Alabama. In southern Mississippi the range was from $2 to $5 per M. Practically the same ranges were quoted for southern Louisiana; the average for Sabine and Calcasieu parishes was $3.79. In the eastern counties of Texas longleaf pine stumpage values were from $1.25 to $5 per M. In Arkansas, the leading shortleaf pine producing State, stumpage values were quoted at from $1 to $5 per M, with an average of approximately $2.50 per M.

In eastern Virginia loblolly or North Carolina pine was quoted at from $1.50 to $7 per M, with an average of slightly more than $3. The range in eastern North Carolina was from $1.50 to $4, with an average of $2.56. The average stumpage price quoted for this species in northern Mississippi was $1.60 per M, with a range of from $1 to $3; and in Texas the reports upon the value of loblolly ran up to $2.50.

MAPLE.

Six hundred and fifty-one reports from 27 States gave an average value of $2.50 for maple stumpage. A few reports as high as $15 were received, and quotations up to $10 were not infrequent. In the

lower peninsula of Michigan, the most important maple-producing region, the range was from $2 to $10, with an average of $4.55, in strong contrast with the average of $1.91 reported from the upper peninsula. In northern Wisconsin the highest quotations were the same as those in the southern peninsula of Michigan, but the average was not quite half as high. The same ranges were found in central Pennsylvania, with an average of $4.16 per M, which is increased to $5.92 in the northwestern part of the State. In West Virginia, the most important of the southern Appalachian States in the production of maple, stumpage quotations ran from 50 cents to $5 per M, with an average of approximately $2 per M.

It is interesting to note that 20 quotations upon stumpage prices for maple in Oregon and Washington ranged from 50 cents to $10 per M, with an average of about $2.75.

RED GUM.

The average price of red gum stumpage is $2.46 per M, according to 291 reports from 18 States. The State averages ran from $1.05 in Texas to $6.93 in Indiana. In the principal red gum producing sections of Arkansas the stumpage quotations ranged from 50 cents to $3 per M, with an average of about $1.25. The average value is higher in Missouri, where the highest quotations were $4 per M. In Mississippi, the third State in point of red gum production, approximately the same values were quoted as in Arkansas. In western Kentucky an average of $4.69 was reported, the highest for any region in which there is considerable red gum production.

REDWOOD.

The reported average value of redwood stumpage in California was $2.35 per M. In the redwood belt north of San Francisco Bay, the principal region of redwood lumber production, the average was $1.97 per M, the minimum $1 and the maximum $5. The reported prices for redwood stumpage in the counties south of the bay, where the stands are much more limited, ranged from $2 to $8 per M, with an average of $3.85.

WESTERN PINE.

About 200 reports upon the stumpage value of western pine gave an average of $1.66 per M, with State averages ranging from $1.08 in Oregon to $2.67 in Arizona. Most of the reports from California, the largest western pine lumber producing State, came from the northern interior counties, and ranged from 50 cents to $3, with an average of $1.35. The same range was reported from eastern Wash-

ington, with an average of $1.88; and practically the same values were given for both northern and southern Idaho. The highest value reported was $6, from South Dakota. The values reported for western pine fall within closer limits than those of any other species.

DOUGLAS FIR.

Two hundred and sixty-six reports upon the stumpage value of Douglas fir gave an average value of $1.44 per M. State averages ranged from $1.11 in Oregon to $3 in New Mexico. There is but little Douglas fir in New Mexico, however. In the coast and Puget Sound sections of Washington, the great centers of Douglas-fir lumber production, the extreme stumpage prices quoted were 50 cents and $5 per M, with an average of about $1.75. In western Oregon the prices quoted were considerably lower, with an average of $1.09 per M. Nearly the same values were given for northern California.

TUPELO.

About 90 reports upon the value of tupelo stumpage gave an average of $1.27 per M, the extreme quotations being 50 cents and $5 per M. In Louisiana, the largest tupelo-producing State, the average value of tupelo was reported as about $1 per M. In the Mississippi Valley section of Mississippi the range was from $1 to $2, with an average of $1.23, and in Alabama the same range was given, with an average of about $1.50.

CONSUMPTION OF CROSS-TIES IN 1906.

The statements in this report are based on the number of ties bought rather than on the number actually used. For all practical purposes, however, the two are identical; because the purchases in twelve months are an accurate index of consumption for a corresponding period.

The purchases of cross-ties by steam and street railroads of the United States during the year 1906 amounted to 102,834,042, valued at $48,819,124, an average of 47 cents per tie. This value represents the cost to the purchaser at the point of purchase. In many, perhaps most, cases this point of purchase is the point of production, near the road's right of way; but in others, and this is particularly true of sawed pine ties, long shipments are involved and the point of purchase is a local distributing market, distant from the source of supply. The average value of 47 cents, therefore, probably represents a higher rate than that received by the producer. The steam railroads purchased 93,477,625 ties, or about nine-tenths of the whole number.

Street railways as a rule use a smaller, lighter tie than that required by the steam roads, so their material is less difficult to obtain.

KINDS OF WOODS USED.

Table 1 summarizes, by kinds of wood, the quantities of hewed and sawed ties purchased in 1906. Approximately one-fourth were sawed and three-fourths hewed.

TABLE 1.—*Cross-ties purchased by steam and street railroads in 1906.*

Kind of wood.	Total.	Hewed.	Sawed.
Oaks	45,357,874	38,269,030	7,088,844
Southern pines	18,841,210	13,745,716	5,095,494
Douglas fir	7,248,562	657,934	6,590,628
Cedar	7,083,442	5,429,305	1,654,137
Chestnut	6,588,975	5,450,920	1,138,055
Cypress	5,104,496	4,448,052	656,444
Western pine	3,969,605	1,884,096	2,085,509
Tamarack	2,576,859	2,360,873	215,986
Hemlock	2,058,198	1,928,726	129,472
Redwood	1,248,629	892,687	355,942
Lodgepole pine	554,738	554,738	.....
White pine	373,387	278,270	95,117
All others	1,828,067	1,593,647	234,420
Total	102,834,042	77,493,994	25,340,048

Table 2 shows the quantity and value of hewed and sawed ties of various woods purchased by steam and street railroad companies in 1906. The average value of the sawed tie is higher than that of the hewed tie.

TABLE 2.—*Number and value of ties purchased by steam and street railroads of the United States in 1906.*

	Total.			Steam railroads.					
				Hewed.			Sawed.		
	Number.	Value.	Average value per tie.	Number.	Value.	Average value per tie.	Number.	Value.	Average value per tie.
Oaks	45,357,874	$23,278,052	$0.51	35,507,777	$17,583,827	$0.50	6,024,852	$3,672,691	$0.61
Southern pines	18,841,210	9,567,745	.51	12,851,239	6,311,585	.49	4,686,851	2,593,424	.55
Douglas fir	7,248,562	3,010,392	.42	631,939	220,331	.35	6,074,283	2,562,636	.42
Cedar	7,083,442	3,310,116	.47	4,940,337	2,334,675	.47	1,476,530	709,771	.48
Chestnut	6,588,975	2,995,942	.49	3,878,970	1,787,167	.46	767,793	345,817	.45
Cypress	5,104,496	1,862,135	.36	4,354,720	1,512,033	.35	633,865	301,467	.48
Western pine	3,969,605	1,698,027	.43	1,869,731	840,555	.45	2,039,769	832,804	.41
Tamarack	2,576,859	889,561	.35	2,340,050	795,803	.34	90,186	41,414	.46
Hemlock	2,058,198	582,968	.28	1,912,540	523,741	.27	124,462	53,155	.43
Redwood	1,248,629	536,172	.43	539,060	182,343	.34	186,286	66,501	.36
Lodgepole pine	554,738	210,818	.38	553,838	210,458	.38			
White pine	373,387	151,052	.40	243,515	70,397	.29	14,515	6,436	.44
All others	1,828,067	726,144	.40	1,575,699	587,162	.37	158,818	74,339	.47
Total	102,834,042	48,819,124	.47	71,199,415	32,960,077	.46	22,278,210	11,260,455	.51

	Street railroads.					
	Hewed.			Sawed.		
	Number.	Value.	Average value per tie.	Number.	Value.	Average value per tie.
Oaks	2,761,253	$1,428,714	$0.52	1,063,992	$592,820	$0.56
Southern pines	894,477	438,180	.49	408,643	224,556	.55
Douglas fir	25,995	8,747	.34	516,345	218,678	.42
Cedar	488,968	194,238	.40	177,607	71,432	.40
Chestnut	1,571,950	701,301	.45	370,262	161,657	.44
Cypress	93,332	36,920	.40	22,579	11,715	.52
Western pine	14,365	4,641	.32	45,740	20,027	.44
Tamarack	20,823	7,394	.35	125,800	44,950	.36
Hemlock	16,186	4,532	.28	5,010	1,540	.31
Redwood	353,627	171,939	.49	169,656	115,389	.68
Lodgepole pine	900	360	.40			
White pine	34,755	17,108	.49	80,602	57,111	.71
All others	17,948	8,437	.47	75,602	56,206	.74
Total	6,294,579	3,022,511	.48	3,061,838	1,576,081	.52

Oak, the chief wood used for ties, furnishes more than 44 per cent, nearly one-half of the whole number, while the southern pines, which rank second, contribute about one-sixth. Douglas fir and cedar, the next two, with approximately equal quantities, supply less than one-fifteenth apiece. Chestnut, cypress, western pine, tamarack, hemlock, and redwood are all of importance, but no one of them furnishes more than a small proportion.

Oak and southern pine stand highest in both total and average value; the average value of each is 51 cents. Chestnut ranks next, followed by cedar. Hemlock, at 28 cents, is the cheapest tie reported.

More than three-fourths of all ties are hewed; and with every wood from which ties are made, except Douglas fir and western pine,

the number of hewed ties is greater than the number sawed. About ten times as many Douglas fir ties are sawed as are hewed. Of the oak ties a little over one-sixth and of the southern pine ties less than one-third are sawed. In general, when lumber has a relatively low value the proportion of sawed ties increases, because the market for ties is always active, while that for lumber is frequently sluggish. All western species are affected by this condition, for stumpage is abundant and its value relatively low.

About one-third of the ties used by street railroads are sawed, but not quite one-fourth of those used by steam roads. The greater proportion of sawed ties used by street lines is probably due to the fact that much of the trackage within city limits is on paved streets, where sawed ties are more satisfactory on account of their regular shape.

The average price of the sawed tie is, as a rule, higher than that of the hewed one, despite the fact that the hewed tie is more durable. This peculiar condition of an inferior commodity bringing a higher price is brought about by the difference in market conditions. Sawed ties, though admittedly less durable, represent a potential value equivalent to the amount of lumber into which they could be cut. Hewed ties, on the other hand, compete only with posts or fuel wood, both of which are of lower value.

CONSUMPTION IN 1905 AND IN 1906.

Table 3 shows the number and value of the different kinds of ties purchased by the steam and street railroad lines in the United States in 1906, and contrasts the purchases of steam railroad companies in 1905 and 1906. No statistics are available upon the purchases by street lines in 1905.

TABLE 3.—*Number and value of ties purchased by steam and street railroads in the United States in 1905 and 1906.*

	Steam railroads, 1905.			Steam railroads, 1906.			Street railroads, 1906.[a]		
	Number.	Value.	Average value per tie.	Number.	Value.	Average value per tie.	Number.	Value.	Average value per tie.
Oaks	34,677,304	$19,072,517	$0.55	41,532,629	$21,256,518	$0.51	3,825,245	$2,021,534	$0.53
Southern pines[b]	18,351,037	7,707,436	.42	17,538,090	8,905,009	.51	1,303,120	662,736	.51
Cedar	6,962,827	3,063,644	.44	6,416,867	3,044,446	.47	666,575	265,670	.40
Douglas fir	3,633,276	1,198,981	.33	6,706,222	2,782,967	.41	542,340	227,425	.42
Chestnut	4,717,604	2,264,450	.48	4,646,763	2,132,984	.46	1,942,212	862,958	.44
Cypress	3,483,746	1,149,636	.33	4,988,585	1,813,500	.36	115,911	48,635	.42
Western pine	(c)			3,909,500	1,673,359	.43	60,105	24,668	.41
Tamarack	3,060,082	1,101,630	.36	2,430,236	837,217	.34	146,623	52,344	.36
Hemlock	1,713,090	565,320	.33	2,037,002	576,896	.28	21,196	6,072	.29
Redwood	590,852	118,170	.20	725,346	248,844	.34	523,283	287,328	.55
Lodgepole pine	(c)			553,838	210,458	.38	900	360	.40
White pine	(c)			258,030	76,833	.30	115,357	74,219	.64
All others	791,409	343,662	.43	1,734,517	661,501	.38	93,550	64,643	.69
Total	77,981,227	36,585,446	.47	93,477,625	44,220,532	.47	9,356,417	4,598,592	.49

[a] No figures for street railroads in 1905.
[b] For 1905 includes white pine, lodgepole pine, and western pine.
[c] Included in southern pines.

The purchases of ties reported by the steam railroad companies in 1906 exceeded those of 1905 by more than 15,000,000. Nearly one-half of this excess was oak. The purchases of cedar ties showed a decrease of about one-half million, due possibly to the sharp demand for cedar poles, which operated against the production of ties. Douglas fir ties nearly doubled in quantity, and both cypress and hemlock increased by a large percentage, but tamarack purchases fell off more than one-fifth and chestnut about 1.5 per cent.

The street railways use about the same proportion of oak ties as the steam roads, a larger proportion of southern pine, cedar, chestnut, cypress, and hemlock, but a smaller proportion of Douglas fir, western pine, and tamarack. Comparing the consumption of ties by steam railroads and street railroads, there is practically no difference between the average values per tie for all kinds of timber combined, but the average costs per tie for the individual kinds of wood show some wide variations. These can not be attributed to any general condition, but are probably due to local influences which operate to increase or decrease the cost to users of certain kinds of ties in particular regions. Such local conditions in turn affect the general average for the kind of timber for the whole United States.

PRESERVATION.

The question of tie preservation is becoming more and more important as the demand for tie material increases and the traffic requirements become more exacting. So long as plenty of white oak ties could be secured the necessity for tie preservation was not felt; but with the constantly increasing use of pine and other less decay-resistant woods, it has become a vital economic question. The railroad companies have met the problem by establishing treating plants in various parts of the United States and by laying experimental tracks with treated ties to determine the efficiency of the several preservatives under varying conditions.

In 1906 the purchases of treated ties by steam and street railroad companies combined amounted to 5,289,435; in addition to this quantity, the companies treated 6,490,203 at their own plants, a total of 11,779,630 treated ties during the year, or 11.5 per cent of the whole number. Of this total the steam railroad companies purchased, during the year, 4,773,116 treated ties, and applied preservatives to 6,365,523 at their own plants. The street lines used 640,999 treated ties, 516,319 of them already prepared when they were bought, and 124,680 treated at their own plants.

PRODUCTION OF SLACK COOPERAGE STOCK IN 1906.

This report gives statistics of the production of slack cooperage stock by 712 mills in 1906. The data were gathered entirely through correspondence, and the results are not altogether satisfactory, as beyond question the actual production of the year was greater than that reported. The incompleteness of the figures is due chiefly to the failure of many manufacturers to reply to any of the several requests for information which were sent to them, and, in small degree, to the imperfect list of manufacturers available. Since statistics on this industry have never before been compiled in a comprehensive manner, it is impossible to draw conclusions as to the relative completeness of the returns. It is sincerely hoped that in the future, as the purpose of the annual investigations is better understood, the manufacturers will respond more promptly to the requests sent them, and that complete figures may be obtained.

WOODS CHIEFLY USED FOR SLACK COOPERAGE.

Table 1 summarizes the production of staves, heading, and hoops and shows the total number manufactured from each species with the average value per 1,000. The total reported production was 1,097,063,000 staves, valued at $6,081,880, or a little more than $5.50 per 1,000; 129,555,000 sets of heading, valued at $5,622,168, an average value of approximately 4 cents per set; 330,892,000 hoops, valued at $2,486,517, or $7.50 per 1,000. Staves were manufactured in considerable quantities from 14 different kinds of wood. The most important of these was elm, which furnished more than one-fifth of the total number, with pine and red gum ranking next. These three kinds furnished practically one-half of the total number. Of the different kinds of staves, ash shows the highest average value—$7.40 per 1,000. This is because the majority of the ash staves are used for butter tubs and other packages that require wood which is sound and durable and at the same time is absolutely free from odor or taste that can be imparted to the contents.

Elm, a wood which has long stood preeminent in the manufacture of slack barrels, and which only recently has been approached by other woods, brought nearly $7 per 1,000 staves. Red oak, which

makes an excellent stave, brought $6.29 per 1,000. Red gum ranked next, at $5.33 per 1,000, while maple, beech, and birch, as might be expected, ranked very close in value, at about $5 per 1,000. Other woods, as a rule, had a lower average value.

TABLE 1.—*Production of slack cooperage stock, 1906 (712 mills).*

[Number expressed in thousands.]

Kind of wood.	Staves.			Heading.			Hoops.		
	Number.	Value.	Average value per 1,000.	Number.	Value.	Average value per 1,000.	Number.	Value.	Average value per 1,000.
Elm	248,118	$1,728,621	$6.97	19,472	$929,382	$47.73	302,628	$2,373,634	$7.84
Pine	187,584	886,545	4.73	28,730	1,227,120	42.71			
Red gum	142,952	761,716	5.33	16,519	705,405	42.70			
Maple	99,642	485,745	4.87	9,317	352,393	37.82			
Beech	80,052	378,392	4.73	11,686	495,502	42.40			
Oak	70,869	446,042	6.29	2,710	123,730	45.66	6,670	42,112	6.31
Chestnut	69,674	290,840	4.17	292	12,395	42.45			
Birch	62,754	289,190	4.61	2,948	118,500	40.20	2,466	5,055	2.05
Ash	47,603	354,308	7.44	2,856	120,911	42.34	12,515	38,212	3.05
Spruce	31,605	145,369	4.60	1,027	34,080	33.18			
Cottonwood	21,912	140,020	6.39	9,162	433,170	47.28			
Hemlock	12,453	50,055	4.02						
Basswood	8,307	44,128	5.31	15,653	737,490	47.11			
Sycamore	8,214	44,354	5.40	362	14,970	41.35			
All other	5,324	36,555	6.87	8,821	357,120	40.49	6,613	27,504	4.16
Total	1,097,063	6,081,880	5.54	129,555	5,662,168	43.70	330,892	2,486,517	7.51

The figures indicate that pine is the wood chiefly employed in the manufacture of heading, followed by elm, red gum, basswood, and beech. These six different kinds of wood furnish nearly two-thirds of all the heading manufactured. Elm is the wood chiefly used for the manufacture of hoops, although a considerable quantity of ash, oak, and birch is used. The large variety of woods used for slack cooperage is in striking contrast with the tight cooperage industry, in which one wood—white oak—furnishes nearly the whole amount.

SLACK BARREL STAVES.

Table 2 shows the production of staves in the different States, by kinds of wood. About two-thirds of the slack barrel staves manufactured are produced in the following States, named in the order of their importance from a standpoint of quantity: Pennsylvania, Virginia, Michigan, Missouri, Ohio, Illinois, and Arkansas. Rated in the order of the value of the staves, however, Michigan ranks first, followed by Pennsylvania, Virginia, Missouri, Ohio, Illinois, and Arkansas. In the production of elm staves Michigan leads, followed by Ohio, Missouri, and Illinois. These four States produce the bulk of this stock. Maple staves are produced chiefly in Pennsylvania, Michigan, and Minnesota; and beech staves in

Pennsylvania and Michigan. More than one-half of the total number of pine staves is produced in Virginia. This gives Virginia her rank of second place in order of importance for number of staves, and third for value. Missouri leads in the manufacture of gum staves, followed by Georgia and Arkansas. The oak staves, practically all of which are some form of red oak, are manufactured chiefly in Indiana, Ohio, and Tennessee, although a large number are manufactured in Virginia. Chestnut staves are manufactured almost entirely in Pennsylvania, which produced over four-fifths of the 69,000,000 manufactured. Birch also is manufactured chiefly in Pennsylvania, and more than one-half of the total number come from that State. Ash, the wood which commands the highest average price when manufactured into staves, has its largest production in Missouri and Arkansas. Maine ranks first in spruce staves, and furnishes more than one-half of them. The quantity manufactured from the other species in that State is comparatively unimportant. Cottonwood, hemlock, sycamore, and basswood are not confined particularly to any one State or group of States. At present slack stave production centers more in the Northern and Eastern States than in the Southern States; this is not the case with tight barrel staves.

TABLE 2.—*Production of slack barrel staves, by States, in 1906.*

[Number expressed in thousands.]

State.	Total.		Elm.	Maple.	Beech.	Pine.	Red gum.	Oak.
	Number.	Value.						
Alabama	1,867	$8,208	.....	.....	.....	1,867	.....	.....
Arizona	150	750	.....	.....	.....	150	.....	.....
Arkansas	62,944	430,453	4,984	.....	.....	8,198	14,540	3,840
Delaware	812	5,660	.....	.....	.....	812	.....	.....
Florida	4,694	34,055	.....	.....	.....	4,694	.....	.....
Georgia	3,370	24,370	.....	.....	.....	1,370	.....	.....
Illinois	70,251	442,078	37,811	3,354	2,906	.....	23,808	90
Indiana	40,910	262,979	14,295	1,660	530	.....	1,000	20,391
Kentucky	16,574	129,485	810	220	1,240	.....	11,874	1,330
Louisiana	9,017	56,560	.....	.....	.....	1,040	3,000	700
Maine	48,158	250,251	11,325	4,775	3,901	3,672	.....	90
Maryland	20,311	70,895	650	100	.....	19,201	.....	150
Massachusetts	8,112	47,272	1,000	200	.....	6,600	.....	.....
Michigan	121,982	726,606	63 886	24,776	26,792	1,000	.....	11
Minnesota	17,558	104,326	2,140	11,066	.....	3,162	.....	.....
Mississippi	5,551	35,206	1,000	.....	.....	.....	2,230	1,465
Missouri	114,893	693,957	22,727	380	.....	.....	63,150	1,500
New Hampshire	22,680	124,890	5,625	.....	5,625	10,880	.....	.....
New York	21,353	120,716	5,015	2,266	345	.....	.....	15
North Carolina	800	3,425	.....	.....	.....	300	500	.....
Ohio	72,028	479,228	55,500	5,687	2,627	.....	100	1,974
Pennsylvania	176,562	710,704	660	42,434	34,995	2,184	.....	625
Oregon	7,000	28,000	.....	.....	.....	4,000	.....	.....
Rhode Island	1,664	9,984	.....	.....	.....	.....	.....	.....
South Carolina	5,075	20,740	.....	.....	.....	5,075	.....	.....
Tennessee	43,477	269,686	7,120	.....	11	700	12,750	19,856
Vermont	4,760	25,050	400	50	.....	.....	.....	.....
Virginia	144,769	701,619	800	50	50	107,679	10,000	16,757
Washington	21,450	92,550	.....	.....	.....	5,000	.....	.....
West Virginia	5,117	32,456	2,685	124	30	.....	.....	2,075
Wisconsin	23,174	139,421	9,685	2,500	1,000	.....	.....	.....
Total	1,097,063	6,081,800	248,118	99,642	80,052	187,584	142,952	70,869

TABLE 2.—*Production of slack barrel staves, by States, 1906*—Continued.

State.	Chestnut.	Birch.	Ash.	Spruce.	Cottonwood.	Hemlock.	Sycamore.	Basswood.	All other.
Arkansas	.....	.....	23,642	.....	7,689	.....	51	.....	.....
Georgia	.....	.....	2,000	.....	.....	.....	.....	.....	.....
Illinois	.....	502	406	.....	714	.....	660	.....	.....
Indiana	.....	.....	150	.....	125	.....	250	2,430	79
Kentucky	.....	.....	700	.....	200	.....	200	.....	.....
Louisiana	.....	.....	.....	.....	4,277	.....	.....	.....	.....
Maine	659	3,193	11	17,553	.....	453	.....	21	2,505
Maryland	.....	.....	100	.....	10	.....	100	.....	.....
Massachusetts	20	.....	.....	292	.....	.....	.....	.....	.....
Michigan	540	1,972	672	.....	.....	1,900	.....	333	.....
Minnesota	.....	500	240	.....	.....	.....	.....	450	.....
Mississippi	.....	.....	.....	.....	816	.....	.....	.....	40
Missouri	.....	.....	17,342	.....	3,104	.....	6,690	.....	.....
New Hampshire	550	.....	.....	.....	.....	.....	.....	.....	.....
New York	10	13,147	170	.....	.....	.....	.....	385	.....
Ohio	808	20	1,628	.....	862	.....	263	2,559	.....
Pennsylvania	58,587	35,060	192	500	50	500	.....	475	300
Oregon	.....	.....	.....	3,000	.....	.....	.....	.....	.....
Rhode Island	1,664	.....	.....	.....	.....	.....	.....	.....	.....
Tennessee	.....	.....	.....	.....	3,015	.....	.....	25	.....
Vermont	.....	.....	350	3,660	.....	.....	.....	.....	300
Virginia	6,733	.....	.....	.....	1,050	.....	.....	.....	1,650
Washington	.....	.....	.....	6,600	.....	9,600	.....	.....	250
West Virginia	3	.....	.....	.....	.....	.....	.....	.....	200
Wisconsin	.....	8,360	.....	.....	.....	.....	.....	1,629	.....
Total	69,674	62,754	47,603	31,605	21,912	12,453	8,214	8,307	5,324

SLACK BARREL HEADING.

Table 3 shows that the production of heading reported was 129,555,000 sets. No one State ranks far ahead of the others in the production of heading, but one-sixth of it is produced in Virginia. Michigan ranks second, Illinois third, Maryland fourth, and Missouri fifth. These are the most important States, although North Carolina, Ohio, and Pennsylvania also produce considerable quantities. Pine, which ranks first as the heading wood, is produced chiefly in Virginia, which State produced over 21 million sets. Illinois and Ohio furnish most of the elm heading. Nearly one-half of the beech heading comes from Pennsylvania, and the greater part of the remainder is furnished by Michigan and Illinois. Red gum heading has of recent years come into favor. The wood makes good slack barrel heading because it is soft and easily worked. It rivals basswood and cottonwood for this purpose. The greater part of the red gum production comes from four States—Missouri, Maryland, Arkansas, and Illinois.

TABLE 3.—*Production of slack barrel heading, by States, 1906.*

[Number of sets in thousands.]

State.	Total.		Oak.	Pine.	Elm.	Beech.	Bass-wood.	Red gum.
	Number sets.	Value.						
Alabama	1,001	$30,020	.....	1,001	.....	.....	.....	.....
Arizona	40	2,000	.....	40	.....	.....	.....	.....
Arkansas	4,300	145,563	.....	689	145	.....	.....	2,743
Florida	384	16,110	.....	384	.....	.....	.....	.....
Georgia	85	2,390	.....	85	.....	.....	.....	.....
Illinois	13,729	655,865	20	.....	8,220	2,020	1,500	1,783
Indiana	3,910	187,150	250	.....	716	.....	1,205	610
Iowa	38	1,520	.....	38	.....	.....	.....	.....
Kentucky	4,044	343,977	517	1,804	346	409	.....	524
Louisiana	1,152	66,500	.....	18	.....	.....	.....	.....
Maine	2,900	100,690	.....	381	711	24	20	.....
Maryland	10,905	465,200	.....	5	600	.....	4,300	3,000
Massachusetts	711	18,820	.....	629	40	.....	.....	.....
Michigan	14,211	569,071	165	50	1,013	2,443	2,844	.....
Minnesota	1,218	48,720	.....	218	.....	.....	.....	.....
Mississippi	25	1,200	.....	.....	.....	.....	.....	15
Missouri	9,732	462,472	.....	.....	480	.....	.....	7,106
New Hampshire	2,470	69,900	.....	1,370	.....	1,000	.....	.....
New York	3,218	132,282	431	7	1,262	248	314	.....
North Carolina	8,070	322,100	.....	30	.....	.....	.....	.....
Ohio	7,364	314,023	131	.....	4,748	483	1,335	.....
Pennsylvania	6,389	322,730	2	100	5	5,059	8	.....
Oregon	300	12,000	.....	200	.....	.....	.....	.....
South Carolina	260	10,800	.....	250	.....	.....	.....	8
Tennessee	2,070	93,400	510	.....	800	.....	.....	555
Vermont	5	250	.....	.....	.....	.....	.....	.....
Virginia	22,223	863,015	609	21,181	25	.....	.....	175
Washington	4,007	195,490	.....	250	.....	.....	.....	.....
West Virginia	76	3,040	75	.....	1	.....	.....	.....
Wisconsin	4,718	205,870	.....	.....	360	.....	4,127	.....
Total	129,555	5,662,168	2,710	28,730	19,472	11,686	15,653	16,519

State.	Maple.	Birch.	Ash.	Cotton-wood.	Spruce.	Chest-nut.	Syca-more.	All other.
Arkansas	.....	.....	721	2	.....	.....	.....	.....
Illinois	4	2	10	125	.....	.....	45	.....
Indiana	64	200	360	300	.....	.....	100	105
Kentucky	52	.....	.....	392	.....	.....	.....	.....
Louisiana	.....	.....	.....	1,134	.....	.....	.....	.....
Maine	299	738	.....	.....	673	4	.....	50
Maryland	.....	.....	.....	3,000	.....	.....	.....	.....
Massachusetts	38	.....	.....	.....	4	.....	.....	.....
Michigan	6,380	582	385	190	.....	.....	45	114
Minnesota	1,000	.....	.....	.....	.....	.....	.....	.....
Mississippi	.....	.....	.....	.....	.....	.....	.....	10
Missouri	.....	.....	1,200	462	.....	.....	84	400
New Hampshire	.....	.....	.....	.....	.....	100	.....	.....
New York	300	616	.....	.....	.....	40	.....	.....
North Carolina	.....	.....	.....	.....	.....	.....	.....	8,040
Ohio	478	.....	141	30	.....	.....	18	.....
Pennsylvania	602	600	13	.....	.....	.....	.....	.....
Oregon	.....	.....	.....	.....	100	.....	.....	.....
South Carolina	.....	.....	.....	2	.....	.....	.....	.....
Tennessee	100	.....	.....	.....	.....	.....	10	95
Vermont	.....	.....	5	.....	.....	.....	.....	.....
Virginia	.....	.....	.....	25	.....	148	60	.....
Washington	.....	.....	.....	3,500	250	.....	.....	7
Wisconsin	.....	210	21	.....	.....	.....	.....	.....
Total	9,317	2,948	2,856	9,162	1,027	292	362	8,821

SLACK BARREL HOOPS.

Table 4 shows the reported production of slack barrel hoops in 1906. The total number was 330,892,000, valued at $2,486,517. Elm is practically the only wood used for hoops in this country, although a few hoops of other woods are now being cut. The production from only five kinds of wood is shown in the table—elm, oak, hickory, birch, and ash. The "All other" item enumerates 6,188,000 hoops, but the quantity of each separate kind did not amount to as much as that given for hickory. The production of hickory hoops reported is doubtless much below the actual quantity, because, as the majority of hickory hoops are manufactured by hand in the woods and do not come under the classification of factory manufacture, it is impossible to secure complete statistics.

TABLE 4.—*Production of slack barrel hoops, 1906.*

[Number expressed in thousands.]

State.	Total.		Average price per 1,000.	Elm.	Oak.	Hickory.	Birch.	Ash.	All other.
	Number.	Value.							
Arkansas	15,646	$113,598	$7.26	14,454	1,192	.....	.....	.....	.....
Florida	750	6,420	8.56	.....	10	.....	.....	.....	740
Georgia	100	600	6.00	100	.....	.....	.....	.....	.....
Illinois	2,290	22,250	9.72	1,210	810	.....	.....	.....	270
Indiana	38,166	315,298	8.26	37,241	800	25	.....	100	.....
Kentucky	2,199	15,314	6.96	2,199	.....	.....	.....	.....	.....
Louisiana	500	4,500	9.00	500	.....	.....	.....	.....	.....
Maine	583	2,783	4.77	40	60	.....	478	.....	5
Maryland	8,147	65,251	8.01	8,147	.....	.....	.....	.....	.....
Michigan	90,878	684,839	7.54	78,878	.....	.....	.....	12,000	.....
Mississippi	8,720	58,859	6.74	8,720	.....	.....	.....	.....	.....
Missouri	29,398	242,822	8.26	27,398	2,000	.....	.....	.....	.....
New Hampshire	1,038	5,880	5.66	175	55	.....	.....	415	393
New York	8,448	24,125	2.86	430	1,300	.....	1,988	.....	4,730
Ohio	97,306	723,771	7.44	97,306	.....	.....	.....	.....	.....
Tennessee	23,935	178,925	7.48	23,492	443	.....	.....	.....	.....
Washington	50	450	9.00	.....	.....	.....	.....	.....	50
Wisconsin	2,729	20,832	7.63	2,329	.....	400	.....	.....	.....
Total	330,892	2,486,517	7.51	302,628	6,670	425	2,466	12,515	6,188

The highest average price for hoops was obtained in the State of Illinois, $9.72 per 1,000. Approximately five-sixths of the hoops reported were produced in six States, in the following order: Ohio, Michigan, Indiana, Missouri, Tennessee, and Arkansas. Elm is especially adapted to the manufacture of hoops on account of its great toughness and flexibility, and for this reason it is doubtful whether it will ever be superseded by any other wood. Hickory would possibly be as acceptable if it grew in sufficient quantities and could be manufactured cheaply enough to compete with elm.

PRODUCTION OF TIGHT COOPERAGE STOCK IN 1906.

The chief features in the production of tight cooperage stock for the year 1906 were, first, an increase of more than 25,000,000 staves over the production of 1905; second, an increase of more than 5,000,000 sets of heading over the production of 1905; third, an advance in price of all stock, but particularly in the higher grades; and, fourth, a scarcity of heading early in the season, and of staves, particularly oil staves, later in the year.

PRODUCTION.

The increased production, coupled with a strong market throughout the year, indicates clearly that the amount of stock produced was not sufficient to meet all demands. The Pure Food Law strengthened the market for alcoholic packages. Immediately after this law went into effect there was a sharp demand upon distillers for a considerable quantity of bonded goods. To supply this deficiency the distillers were forced to increase their production, and made consequent demand for a large number of barrels. This action alone would have strengthened the market for oil barrels, and, in addition, there was the enormous production of petroleum oil for 1905, greater by over 17,000,000 barrels than for any previous year, and a large production of cotton-seed oil, and many other commodities marketed in tight packages. More than this, the market for white oak lumber had never been so strong in the history of the industry, and since the stave manufacturer must compete directly with the manufacturer of white oak lumber, this fact alone would have been sufficient to cause the price to advance considerably. Altogether, the industry had a very successful year; there was no difficulty in disposing of the stock produced, though there was some in finding a sufficient supply of white oak. A clear indication of this latter condition is found in the increased production of red oak staves. In 1905 the number produced was about 7,000,000, while in 1906 it exceeded 11,000,000.

Table 1 shows that the total production of all kinds of tight staves in 1905 was 241,193,000; in 1906 it reached 267,827,000. The heading production in 1905 aggregated 12,959,000 sets; in 1906 it was 17,774,375 sets. The average price obtained for heading was 23 cents per set, and for staves $31.32 per thousand f. o. b. point of shipment, which in most cases was the point of manufacture.

TABLE 1.—*Quantity of tight barrel staves and heading produced in 1906 and 1905.*

STAVES.

Kind.	1906.			1905.
	Number.	Value.	Average price per thousand f. o. b. point of manufacture.	
	Thousands.	*Dollars.*	*Dollars.*	*Thousands.*
Sawed	219,524	5,746,780	26.18	202,369
Bucked and split	18,352	866,821	47.23	10,792
Hewed	9,781	915,740	93.62	10,396
Ale and beer	20,170	860,301	42.65	17,636
Total	267,827	8,389,642	31.32	241,193

HEADING.

	Sets.	*Dollars.*	*Dollars per set*	*Sets.*
Sawed	16,115,030	3,612,281	0.22	11,023,000
Beer	1,659,345	387,349	.23	1,936,000
Total	17,774,375	3,999,630	.23	12,959,000

There was an increase in the production of all kinds of staves except pork staves; this class shows an unimportant decrease. The amount of heading produced shows a much larger proportionate increase than the number of staves, but in view of the shortage in the heading market last year it may be that this increase is only sufficient to take care of the shortage which occurred at that time.

The total value in Table 1 is less than that given in the figures for 1905,[a] because the value in 1905 represents values "delivered" at Chicago quotations. The value in Table 1 is f. o. b. at point of shipment, and therefore not comparable with the value given in the 1905 circular.

PRICES.

In order to gain a fair comparison of the relative prices obtained for the principal grades of cooperage stock for 1905 and 1906, the following quotations from the Chicago market are given. In 1905 the approximate average price for bucked Bourbon staves was $65 per 1,000; in 1906, figuring at the same period of the year, the average price was $70 per 1,000. Sawed Bourbon staves in 1905 show an average price of $50; in 1906, $56 per 1,000. Spirits and wine advanced from $50 to $52.50; oil and tierce from $32 to $35. The quotations on beer stock showed little variation between the two years. In the heading market there was little difference in the price of Bourbon heading, and seven-eighth inch stock was quoted at $0.50 per set, both in 1905 and 1906. Spirits and wine, however, advanced from 35 cents in 1905 to 42 cents in 1906, while oil and

[a] Circular 53, Forest Service: Wood Used for Tight Cooperage Stock in 1905.

tierce advanced from 20 cents in 1905 to 28 cents per set in 1906. It is believed that the quotations of the Chicago market, as compiled by the Tight Barrel Stave Manufacturers' Association and furnished throughout the year, are substantially correct and indicate the change in prices which has taken place during the season.

EXPORTS.

On an average more than one-fifth of the tight stave production in the United States is exported, as is shown by Table 2, which gives the exports of staves for the fiscal years 1902–1906, as compiled by the Bureau of Statistics of the Department of Commerce and Labor. About four-fifths of all the staves exported go to Europe, and most of the remaining fifth to other countries of North America. The quantity going to South America, Africa, Asia, and Oceania is negligible. Of the European countries, France is by far the largest user of American staves.

TABLE 2.—*Quantity and value of staves exported, 1902–1906.*

Year.	Quantity.	Value.	Average price per thousand.
	Thousands.	*Dollars.*	*Dollars.*
1902	46,999	3,830,432	81.50
1903	55,879	4,740,680	84.84
1904	47,420	4,032,344	85.03
1905	48,286	3,613,635	74.84
1906	57,586	4,699,877	81.61

Nearly all of the exported staves are of high quality and require white oak of the best grade. Thus the export trade makes a disproportionately heavy drain on the supply of white oak—a drain much greater than is indicated by comparison of the number manufactured with the number exported. When it is considered that all staves of all kinds are valued at $8,389,642 at the point of production, and the quantity exported (though only one-fifth in number) is valued at $4,699,877 at the point of exportation, a better idea is obtained of this drain on the best white oak supply.

The fall in the average price in 1905 for export material can be explained only by the lessened foreign demand, due to some unknown factor of spirit production abroad. It can not be attributed to overproduction or to an abundant wood supply in this country.

Table 3 shows the production of tight barrel staves in 1905 and 1906 by States and classes. By far the greater part of this stock is produced in comparatively few States. In 1906 the leading ones in order of their importance were Arkansas, Kentucky, Tennessee, West Virginia, Louisiana, and Alabama. In 1905, however, Kentucky led, followed by Tennessee, Missouri, Arkansas, Louisiana,

Ohio, and West Virginia. West Virginia has very recently become important in the production of staves. It has a wealth of white oak timber, but up to the present time most of it has been very inaccessible. Since 1905, however, the total production from West Virginia has increased from about 11,000,000 to more than 30,000,000 staves.

TABLE 3.—*Production of tight barrel staves in 1905 and 1906, by States.*

State.	Total.				Sawed.	
	1906.			1905.	1906.	1905.
	Number.	Value.	Average price per M (f. o. b. at mill).			
	Thousands.	*Dollars.*	*Dollars.*	*Thousands.*	*Thousands.*	*Thousands.*
Alabama	14,424	451,447	31.30	5,955	13,976	5,893
Arkansas	67,551	2,051,425	30.37	23,939	62,835	21,192
Georgia	1,530	33,250	21.73	.....	1,530	.....
Illinois	1,700	74,100	43.59	8,459	.....	7,756
Indiana	766	17,220	22.48	8,800	766	7,500
Kentucky	61,123	2,236,271	36.59	61,270	40,666	46,980
Louisiana	14,784	884,092	59.80	15,095	7,088	4,506
Michigan	.....	.....	.....	1,325	.....	1,325
Mississippi	11,671	429,832	36.83	6,798	8,273	4,381
Missouri	11,724	232,067	19.79	26,993	11,464	24,871
New York	.....	.....	.....	1,191	.....	1,050
Ohio	1,105	70,075	63.42	12,712	555	12,712
Pennsylvania	612	15,008	24.52	2,704	612	2,561
Tennessee	32,865	808,828	24.61	37,468	29,918	35,093
Texas	2,900	177,309	61.14	3,451	3	2,968
Virginia	5,542	141,150	25.47	2,045	5,205	1,495
West Virginia	30,740	595,728	19.38	11,353	29,700	11,353
All others	8,790	171,840	19.55	11,635	6,933	10,733
Total	267,827	8,389,642	31.32	241,193	219,524	202,369

State.	Bucked and split.		Hewed.		Beer and ale.	
	1906.	1905.	1906.	1905.	1906.	1905.
	Thousands.	*Thousands.*	*Thousands.*	*Thousands.*	*Thousands.*	*Thousands.*
Alabama	448	59	.....	3	.....	.....
Arkansas	3,993	1,930	275	.....	448	817
Georgia	.....	.....	.....	.....	.....	.....
Illinois	.....	.....	.....	3	1,700	700
Indiana	.....	1,300	.....	.....	.....	.....
Kentucky	6,407	2,137	45	43	14,005	12,110
Louisiana	1,067	2,800	6,629	7,384	.....	405
Michigan	.....	.....	.....	.....	.....	.....
Mississippi	2,203	1,119	1,195	1,298	.....	.....
Missouri	.....	590	.....	.....	200	1,532
New York	.....	40	.....	70	.....	31
Ohio	.....	.....	550	.....	.....	.....
Pennsylvania	.....	.....	.....	.....	.....	143
Tennessee	550	.....	700	1,575	1,697	800
Texas	2,547	230	147	20	203	233
Virginia	277	500	60	.....	.....	50
West Virginia	860	.....	180	.....	.....	.....
All others	.....	87	.....	.....	1,857	815
Total	18,352	10,792	9,781	10,396	20,170	17,636

SAWED STAVES.

In the production of sawed staves, which are by far the most important class numerically, Arkansas leads, followed by Kentucky, Tennessee, and West Virginia. In 1905 Kentucky was in the lead, followed by Tennessee, Missouri, and Arkansas.

TABLE 4.—*Production of sawed staves in 1905 and 1906.*

Grade.	Timber.	1906.			1905.
		Number.	Value (f. o. b. at mill).	Price per thousand.	
		Thousands.	*Dollars.*	*Dollars.*	*Thousands.*
Oil and tierce	White oak	107,295	2,484,168	23.15	104,067
Oil and tierce	Red oak	11,578	231,655	20.01	7,737
Spirit and wine	White oak	29,857	1,210,362	40.54	28,094
Bourbon	White oak	22,737	1,117,570	49.15	20,460
Pork	White oak	8,360	160,422	19.19	6,869
Half barrel	White oak	6,687	131,500	19.68	3,821
Cut-offs	Red and white oak	18,831	166,842	8.86	16,770
All others	Miscellaneous	14,179	244,171	17.22	14,551
Total		219,524	5,746,780	26.18	202,369

Table 4 compares the production of sawed staves in 1906 and 1905 by classes and kinds of wood. It is interesting to note that, with the exception of red oak oil and tierce, the proportion of the various grades has not changed greatly. In 1905 the white oak oil and tierce staves amounted to a trifle more than half of the total number of sawed staves; adding the red-oak staves, the oil and tierce production was 55 per cent. In 1906 white oak oil and tierce staves were a little less than one-half the sawed staves; the added red oak staves make the proportion of oil and tierce staves about the same as in 1905. The alcoholic staves still constitute a little less than one-fourth of the total number manufactured. The "All other" classification, which includes gum, poplar, elm, pine, and various other woods, shows an unimportant decrease.

TABLE 5.—*Production of sawed staves, by classes and States, 1906.*

State.	Total.	Oil and tierce.	Spirit and wine.	Bourbon.	Pork.	Half barrel.	Cut-offs.	All others.
	Thousands.	*Thousands.*	*Thousands.*	*Thousands.*	*Thousands.*	*Thousands.*	*Thousands.*	*Thousands.*
Alabama	13,976	7,863	1,350	1,333	156	428	1,865	981
Arkansas	62,835	31,573	17,058	2,703	1,771	507	8,504	719
Georgia	1,530	1,530						
Indiana	766	50	69	161		36		450
Kentucky	40,666	20,240	2,992	14,706	130	194	2,354	50
Louisiana	7,088	3,683	2,096	60	49		356	844
Mississippi	8,273	5,062	2,112	739	20	114	226	
Missouri	11,464	2,900			1,522	2,601	329	4,112
Ohio	555	150			405			
Pennsylvania	612			300			112	200
Tennessee	29,918	16,872	3,700	1,855	2,167	2,427	2,747	150
Texas	3	3						
Virginia	5,205	3,925	180	100	680		320	
West Virginia	29,700	24,722	300	780	1,420	380	2,018	80
All others	6,933	300			40			6,593
Total	219,524	118,873	29,857	22,737	8,360	6,687	18,831	14,179

The rank of the States in the production of sawed staves is about the same as in total production, except that Louisiana, which produces many hewed staves, stands relatively lower than in the total production.

BUCKED AND SPLIT STAVES.

Table 6 shows the production of bucked and split staves by classes for 1905 and 1906, and Table 7 that by States for 1906. The production of this grade of staves shows an increase from 10,792,000 to 18,352,000. This class of stock is produced exclusively for the storage and transportation of alcoholic liquors, and the most of it is exported. Nearly one-half of the total production is Bourbon, followed by West Indian spirit and wine.

TABLE 6.—*Production of bucked and split staves, 1905 and 1906.*

Grade.	1906.			1905.
	Number.	Value.	Price per thousand.	
	Thousands.	*Dollars.*	*Dollars.*	*Thousands.*
Bourbon	8,979	477,568	53.19	5,020
West Indian	4,136	177,055	42.81	1,966
Spirit and wine	2,942	137,301	46.67	1,882
Seconds	1,799	61,132	33.98	1,538
Half barrel	357	11,715	32.82	291
Cut-offs	139	2,050	14.75	95
Total	18,352	866,821	47.23	10,792

The average value per 1,000 of Bourbon bucked and split staves is very much higher than for the same class of sawed staves. This is due to the fact that this stock is made entirely by hand by a slow, expensive process, and, further, an unusually high grade of white oak is required, and it is impossible to get from the same amount of wood as many split staves as sawed staves.

TABLE 7.—*Production of bucked and split staves, by States, 1906.*

State.	Total.	Bourbon.	West Indian.	Spirit and wine.	Seconds.	Half barrels.	Cut-offs.
	Thousands.	*Thousands.*	*Thousands.*	*Thousands.*	*Thousands.*	*Thousands.*	*Thousands.*
Alabama	448	264	4	40	140	.....	.....
Arkansas	3,993	2,123	.....	1,620	131	117	2
Kentucky	6,407	2,499	2,785	30	991	65	37
Louisiana	1,067	828	31	175	10	.....	23
Mississippi	2,203	1,155	424	352	262	.....	10
Tennessee	550	250	100	100	100	.....	.....
Texas	2,547	1,700	.....	500	165	175	7
Virginia	277	60	92	125	.....	.....	.....
West Virginia	860	100	700	.....	.....	.....	60
Total	18,352	8,979	4,136	2,942	1,799	357	139

HEWED STAVES.

Table 8 shows the production of hewed staves by classes, and Table 9 that by States, in 1906. The two principal items in this classification are French claret and pipe staves. The average price per thousand is misleading, because there are so many different sizes in this class of hewed stock and the ratio of increase in price is dis-

proportionately greater than the increase in size. The $75 per thousand for French claret and $121 for pipe staves are at best very general averages and can not be taken as prices for any particular size of stock. In the "All other" items are included a miscellaneous classification, such as tank staves and Canada butts. Louisiana produces about two-thirds of all the hewed staves.

TABLE 8.—*Production of hewed staves.*

Grade.	1906.			1905.
	Number.	Value.	Price per thousand.	
	Thousands.	*Dollars.*	*Dollars.*	*Thousands.*
French claret	7,442	560,500	75.32	10,193
Pipe	1,363	165,040	121.09	95
All others	976	190,200	194.88	108
Total	9,781	915,740	93.62	10,396

TABLE 9.—*Production of hewed staves by States, 1906.*

State.	Total.	French claret.	Pipe.	All others.
	Thousands.	*Thousands.*	*Thousands.*	*Thousands.*
Arkansas	275	243	.....	32
Kentucky	45	.....	37	8
Louisiana	6,629	5,641	769	219
Mississippi	1,195	896	272	27
Ohio	550	.....	.....	550
Tennessee	700	600	.....	100
Texas	147	62	85	.....
Virginia	60	.....	60	.....
West Virginia	180	.....	140	40
Total	9,781	7,442	1,363	976

HEADING.

Table 10 shows the production of tight barrel heading by States, giving in detail the quantities of different kinds. Beer heading and staves are tabulated separately, because the difference in the form of this stock, such as barrel, half barrel, quarter barrel, etc., makes it impossible to classify it with the sawed heading and staves shown elsewhere. In the production of heading Arkansas leads, followed by Tennessee. The combined production of these two States amounts to about two-thirds of the total production in the United States. The only other States that produced any considerable quantity of heading are Mississippi, West Virginia, and Kentucky. The best grade of Bourbon heading is produced in largest quantity in Kentucky, followed by Mississippi and Tennessee. Mississippi's second place indicates in a measure at least that there is slight foundation for the popular idea that oak from the most southern States is of a poorer quality than that grown farther north. In the production of beer heading, Kentucky leads, as it does in the production of beer staves.

TABLE 10.—*Production of tight barrel heading, by classes and States, 1906.*

[Figures show actual number of sets.]

SETS OF SAWED HEADING.

State.	Total.	Oil and tierce.	Bourbon.	Spirit and wine.	Half barrel and keg.	Miscellaneous.
	Number.	*Number.*	*Number.*	*Number.*	*Number.*	*Number.*
Alabama	15,000	10,000	3,000	2,000		
Arkansas	5,699,484	3,343,750	210,349	926,415	261,760	957,210
Georgia	90,121	55,000				35,121
Indiana	220,000	100,000			80,000	40,000
Kentucky	1,218,394	365,000	600,321	175,901	41,430	35,742
Louisiana	47,300					47,300
Maine	110,000					110,000
Mississippi	1,701,335	645,193	576,573	349,945	90,305	39,319
Missouri	430,382	300,000		10,000	120,382	
Ohio	30,150	10,100	50			20,000
Tennessee	5,011,773	2,672,465	511,387	528,561	993,473	305,887
Texas	12,000	12,000				
West Virginia	1,425,914	628,514	366,500	12,000	301,900	117,000
Wisconsin						
All others[a]	103,177					103,177
Total	16,115,030	8,142,022	2,268,180	2,004,822	1,889,250	1,810,756

SETS OF BEER HEADING.

State.	Total.	Barrel.	Half barrel.	Fourth barrel.	Eighth barrel.	Ale hogshead.	Ale barrel.	Ale half barrel.
	Number.	*Number.*	*Number.*	*Number.*	*Number.*	*No.*	*Number.*	*No.*
Alabama								
Arkansas	165,316	18,326	115,221	17,828	13,631	310		
Georgia								
Indiana								
Kentucky	1,308,287	49,084	290,978	627,819	275,100	4,385	3,754	57,167
Louisiana	38,092	38,092						
Maine	3,750	3,750						
Mississippi								
Missouri	3,700	2,000	400	1,000	300			
Ohio								
Tennessee	10,000	5,000	5,000					
Texas	88,200		55,000				33,200	
West Virginia								
Wisconsin	42,000	6,000	20,000	16,000				
All others[a]								
Total	1,659,345	122,252	486,599	662,647	289,031	4,695	36,954	57,167

[a] Includes California, Florida, Massachusetts, Oregon, and Washington.

Table 11 classifies sawed heading produced in 1906 and shows the average value per thousand of each class. The white oak oil and tierce ranks first, followed by Bourbon, spirit and wine, and all others.

TABLE 11.—*Quantity of sawed heading produced in 1905 and 1906.*

Grade.	1906.			1905.
	Quantity.	Value.	Average price per set.	
	No. of sets.	*Dollars.*	*Dollars.*	*No. of sets.*
Oil and tierce	8,142,022	1,443,342	0.18	5,707,000
Bourbon	2,268,180	941,021	.41	1,897,000
Spirit and wine	2,004,822	690,255	.34	1,581,000
Half barrel and keg	1,889,250	264,755	.14	1,152,000
Pork				208,000
All others[a]	1,810,756	272,908	.15	478,000
Total	16,115,030	3,612,281	.22	11,023,000

[a] Includes 879,908 sets of red oak.

BEER AND ALE STOCK.

STAVES.

Table 12 shows by States and classes the production of beer and ale staves in 1906. This branch of the industry is very much localized and confined closely to the single State of Kentucky. The industry itself is in the hands of a comparatively few men, who, by virtue of their experience, are able most satisfactorily to supply the needs of the users. Considerable skill is required to produce this stock because, since there is no saw which will produce a satisfactory stave, it is necessary to split the stock instead.

TABLE 12.—*Beer and ale staves produced in 1906, by States.*

State.	Total.	Barrel.	Half barrel.	Quarter barrel.	Eighth barrel.	Ale barrel.	Ale half barrel.	Ale and beer hogshead.
	Thousands.	*Thousands.*	*Thousands.*	*Thousands.*	*Thousands.*	*Thousands.*	*Thousands.*	*Thousands.*
Arkansas	448	147	207	54	27	.....	.....	13
Illinois	1,700	.....	650	900	150	.....	.....	.....
Kentucky	14,005	830	4,398	5,635	2,579	224	247	92
Missouri	260	5	62	125	68	.....	.....	.....
Tennessee	1,697	10	450	850	387	.....	.....	.....
Texas	203	67	98	.....	.....	.....	.....	38
All others	1,857	149	359	1,227	79	24	.....	19
Total	20,170	1,208	6,224	8,791	3,290	248	247	162

BEER AND ALE HEADING.

Table 13 shows the production of beer and ale heading for 1905 and 1906.

TABLE 13.—*Quantity of beer and ale heading produced in 1905 and 1906.*

Grade.	1906.			1905.
	Quantity.	Value.	Average price per set.	
	No. of sets.	*Dollars.*	*Dollars.*	*No. of sets.*
Barrel	122,252	43,288	0.35	307,000
Half barrel	486,599	141,127	.29	543,000
Quarter barrel	662,647	88,809	.13	740,000
Eighth barrel	289,031	35,877	.12	346,000
Ale hogshead	4,695	5,276	1.12	.....
Ale barrel	36,954	50,038	1.35	.....
Ale half barrel	57,167	22,934	.40	.....
Total	1,659,345	387,349	.23	1,936,000

Table 14 compares the figures of 1906 and 1905 in the production of beer and ale staves by classes; numerically the quarter-barrel size leads.

TABLE 14.—*Production of beer and ale staves, by classes, in 1906.*

Grade.	1906.			1905.
	Number.	Value.	Price per thousand.	
	Thousands.	*Dollars.*	*Dollars.*	*Thousands.*
Barrel	1,208	97,750	80.92	1,178
Half barrel	6,224	300,108	48.22	6,123
Quarter barrel	8,791	320,931	36.51	7,380
Eighth barrel	3,290	84,932	25.82	2,333
Ale barrel	248	22,920	92.42	96
Ale half barrel	247	15,850	64.17	50
Ale and beer hogshead	162	17,810	109.94	476
Total	20,170	860,301	42.65	17,636

SUBSTITUTES.

While the production of wooden stock has increased it has not increased in proportion to the amount of the product. In the oil industry tank cars have tended to displace barrels.

A large number of bottles are used for transporting and storing beer and ale, but no satisfactory substitute has been discovered for the wooden package. Further, for containers of such material as alcoholic spirits, wines, and whiskies, nothing has proved as satisfactory as a wooden package manufactured from white oak. The great demand on the white oak resources of the country for furniture wood and interior finishing wood, and the removal of the most accessible timber, have greatly increased the price of white oak for all purposes, and the result has been a sharp advance in the price of staves and heading, even within the last year.

In many cases a strong effort is being made to replace white oak with other wood. The situation is, perhaps, most serious on the Pacific coast. Wine growers must have suitable packages for storing and shipping their product, and thus far no substitute has been generally recognized as serving the purpose as well as white oak, yet its scarcity and high price, even in the eastern market, make it almost prohibitive to ship it across the continent. Experiments are now being made to devise a package to replace that of white oak for the storage and transportation of wine. Redwood and cypress are being advanced with some show of success. For transportation these woods are almost too soft, especially the redwood. The success of this project, however, will doubtless be watched with considerable interest by the manufacturers of tight-cooperage stock in the East.

CONSUMPTION OF PULPWOOD IN 1906.

The chief features of the year 1906 in connection with the manufacture of wood-pulp were:

(1) A consumption of wood greater by 469,053 cords than that of any previous year.

(2) The highest average value per cord for all kinds of wood.

(3) An increase of 93,000 cords in the imports of pulpwood. Of the two woods imported—spruce and poplar—spruce alone showed an increase; poplar decreased by over 5,000 cords.

(4) Since 1899 the amount of wood consumed each year for pulp has increased, in round numbers, from 2 million cords to 3½ million cords.

CONSUMPTION.

In 1906 the consumption of wood for pulp exceeded the high-water mark of 3,192,123 cords reached in 1905 by nearly one-half million cords, making the total consumption, by 250 mills, 3,661,176 cords. The year showed a heavy increase in the consumption of hemlock wood, practically all of which is reduced by the sulphite process. Except balsam, the consumption of which fell off by nearly 23,000 cords, or 40 per cent, all other kinds of timber show a normal increase in quantities consumed. The increase for poplar was less than for any of the others, and its consumption remained nearly stationary.

Table 1 shows the quantity of wood of different kinds used for the manufacture of pulp in 1899, 1905, and 1906.

TABLE 1.—*Kinds and amounts of wood manufactured into pulp.*

Kind.	Quantity.			Per cent of increase (+) or decrease (−).	
	1899.	1905.	1906.	1899 to 1905.	1905 to 1906.
	Cords.	*Cords.*	*Cords.*		
Spruce	1,509,202	2,273,254	2,507,002	+50.6	+ 10.3
Poplar	256,953	322,058	328,470	+25.3	+ 2.0
Hemlock	(a)	375,422	528,381	.....	+ 40.7
Pine	(a)	57,399	69,277	.....	+ 20.7
Balsam	(a)	56,744	33,886	.....	− 40.3
Cottonwood	(a)	10,507	.....	.....	.....
All other	220,155	96,739	194,160	−56.1	+100.7
Total	1,986,310	3,192,123	3,661,176	+60.7	+ 14.7

a Included in "All other."

In the census of 1899 the only kinds of wood distinguished were spruce and poplar; all other kinds were grouped under a single head. In 1899 spruce furnished over 75 per cent of all the wood used; in 1905, about 70 per cent, and in 1906 a little less than 70 per cent. It is interesting that the proportion of spruce used has remained so nearly constant in spite of the fact that the total quantity of wood consumed has nearly doubled in the same period and that other woods have been introduced in large quantities. Since 1899, poplar, which for years was used in connection with spruce to the exclusion of all other woods, has increased in total quantity less than 100,000 cords, due to its very limited supply. At present it is outranked by both spruce and hemlock.

Table 2 shows the details of the consumption of pulpwood by States and processes.

TABLE 2.—*Wood used in the production of pulp in 1906, by species, States, and processes.*

MECHANICAL PROCESS.

State.	Spruce.		Poplar.		Balsam.	Hemlock.	Pine.	Miscellaneous.	Total.
	Domestic.	Imported.	Domestic.	Imported.					
	Cords.	*Cords.*	*Cords.*	*Cords.*	*Cords.*	*Cords.*	*Cords.*	*Cords.*	*Cords.*
Maine	120,390	13,134	1,274	.....	190	.....	715	2	135,705
Massachusetts	1,900	.....	750	.....	155	25	10	.....	2,840
Michigan	6,727	.....	50	2,129	64	.....	741	.....	9,711
Minnesota	31,531	.....	125	.....	192	.....	.....	.....	31,848
New Hampshire	73,338	18,000	.....	.....	.....	.....	.....	.....	91,338
New York	385,472	217,233	2,357	.....	2,668	4,000	4,033	.....	615,763
Ohio	4,132	.....	.....	.....	.....	.....	.....	.....	4,132
Oregon	20,700	.....	.....	.....	.....	.....	.....	20,090	40,790
Pennsylvania	1,351	.....	.....	.....	.....	3,108	600	.....	5,059
Vermont	15,914	16,413	1,123	.....	1,518	.....	.....	.....	34,968
Virginia	.....	.....	31	.....	.....	.....	3,059	.....	3,090
West Virginia	7,302	.....	.....	.....	.....	.....	.....	.....	7,302
Wisconsin	148,861	25,300	4,765	.....	6,785	4,736	4,558	536	195,541
All other	8,895	.....	.....	.....	.....	.....	1,400	9,400	19,693
Total	826,511	290,080	10,475	2,129	11,572	11,869	15,116	30,028	1,197,780

SULPHITE PROCESS.

Maine	257,962	82,124	.....	.....	.....	.....	.....	.....	340,086
Massachusetts	20,661	.....	.....	.....	.....	.....	.....	6,405	27,066
Michigan	7,533	25,404	.....	.....	1,142	71,289	.....	193	105,561
Minnesota	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Hampshire	140,499	81,092	.....	.....	6,000	800	.....	.....	228,391
New York	358,108	224,742	.....	.....	5,737	21,277	.....	.....	609,864
Ohio	.....	.....	.....	.....	.....	15,883	.....	8,708	24,591
Oregon	.....	.....	.....	.....	.....	20,480	.....	10,904	31,384
Pennsylvania	9,273	15,380	.....	.....	.....	106,020	.....	.....	130,673
Vermont	.....	.....	.....	.....	.....	.....	.....	.....	.....
Virginia	50,646	.....	.....	.....	.....	.....	.....	.....	50,646
West Virginia	42,513	.....	.....	.....	.....	11,921	.....	.....	54,434
Wisconsin	57,013	.....	.....	.....	9,435	261,842	.....	771	329,061
All other	1,262	.....	.....	.....	.....	7,000	3,600	15,000	26,862
Total	945,470	428,742	.....	.....	22,314	516,512	3,600	41,981	1,958,619

TABLE 2.—*Wood used in the production of pulp in 1906, by species, States, and processes*—Continued.

SODA PROCESS.

State.	Spruce.		Poplar.		Balsam.	Hemlock.	Pine.	Miscellaneous.	Total.
	Domestic.	Imported.	Domestic.	Imported.					
	Cords.	*Cords.*	*Cords.*	*Cords.*	*Cords.*	*Cords.*	*Cords.*	*Cords.*	*Cords.*
Maine	11,927	.....	129,025	1,000	.....	.....	.....	.....	141,952
Massachusetts	.....	.....	3,185	211	.....	.....	.....	.....	3,396
Michigan	.....	.....	.....	.....	.....	.....	.....	.....	.....
Minnesota	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Hampshire	.....	.....	.....	.....	.....	.....	.....	.....	.....
New York	.....	.....	38,677	14,210	.....	.....	.....	17,390	70,277
Ohio	.....	.....	2,000	.....	.....	.....	.....	4,000	6,000
Oregon	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pennsylvania	.....	.....	36,494	.....	.....	.....	41,481	69,266	147,241
Vermont	.....	.....	.....	.....	.....	.....	.....	.....	.....
Virginia	.....	.....	28,028	.....	.....	.....	.....	.....	28,028
West Virginia	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wisconsin	52	2,500	200	.....	.....	.....	.....	15,000	17,752
All other	1,720	.....	62,836	.....	.....	.....	9,080	16,495	90,131
Total	13,699	2,500	300,445	15,421	.....	.....	50,561	122,151	504,777

New York uses more than one-half of the wood reduced by the mechanical process, and more than three times as much as Wisconsin, the State next in rank. Maine, New Hampshire, Oregon, Vermont, and Minnesota follow in the order given.

In the consumption of wood by the soda process Pennsylvania and Maine together consumed more than one-half of the total quantity, Pennsylvania ranking first. The total quantity consumed by the mechanical process was 1,197,780 cords and by the sulphite process 1,958,619 cords. By the soda process 504,777 cords were reduced, of which poplar constituted less than three-fifths. This is rather a striking condition, since no longer ago than 1899 poplar was the only kind of wood reported as being reduced by the soda process. At the present time pine, spruce, and hardwoods, which are not shown separately but are included in the miscellaneous column, enter into the total.

In both the consumption of wood and manufacture of pulp New York has ranked first from the time of the earliest data of which there is record. In 1906 New York alone consumed 1,295,904 cords, or more than twice as much as Maine, which ranks next, with 617,743 cords. Wisconsin ranks third, with 542,354 cords. New Hampshire follows, with 319,729, Pennsylvania with 282,973, and Michigan with 115,272 cords. No other State consumed as much as 100,000 cords. It is interesting that the consumption of New York shows a small decrease from the 1905 figures, while Maine, Wisconsin, Pennsylvania, and New Hampshire have all increased their consumption.

It should be borne in mind in connection with these figures that in practically no case is all the wood produced in the same State in which it is consumed. In New York, for example, the report of the State forest, fish, and game commission shows a cut of 516,778 cords of pulpwood in 1906, or approximately 40 per cent of the amount of wood used by the pulp mills of the State.

MECHANICAL PROCESS.

Domestic spruce ranks first in the mechanical process, with 826,511 cords, and imported spruce second, with 290,080 cords. Of the domestic spruce 385,472 cords and of the imported spruce 217,233 cords were reduced in New York.

The amount of poplar reduced mechanically is comparatively small, amounting to about 12,500 cords. Hemlock and balsam are both used in small quantities. The quantity of pine, however, exceeds that of all other woods except spruce, amounting to over 15,000 cords.

SULPHITE PROCESS.

Of the total amount of wood used in the sulphite process, spruce furnishes about two-thirds and hemlock more than one-fourth. Balsam, pine, and other woods form an unimportant part of the total. As in the mechanical process, New York leads in total consumption with more than one-half million cords, or about one-half of the total amount of spruce consumed by this process. Maine ranks next, with about one-fourth of the total, followed by New Hampshire, with a much smaller amount. A much larger proportion of the imported spruce is reduced by the sulphite than by the mechanical process.

Wisconsin produces more than one-half of the hemlock that is used, followed by Pennsylvania. The combined consumption of hemlock in these two States amounts to three-fifths of the total amount used.

SODA PROCESS.

In 1906, 504,777 cords of wood were reduced by the soda process. About three-fifths of this was poplar, a negligible quantity of which was imported. Maine furnished 129,025 cords of poplar, or more than three times as much as any other State. New York ranks second, Pennsylvania third, and Virginia fourth.

TABLE 3.—*Kind and amounts of wood manufactured into pulp by various processes in 1906.*

[Number of mills, 250.]

Kind.	Total cords.	Process.			Per cent.
		Mechanical.	Sulphite.	Soda.	
Spruce:					
Domestic	1,785,680	826,511	945,470	13,699	48.8
Imported	721,322	290,080	428,742	2,500	19.7
Poplar:					
Domestic	310,920	10,475	.....	300,445	8.5
Imported	17,550	2,129	.....	15,421	.5
Hemlock	528,381	11,869	516,512	.....	14.4
Balsam	33,886	11,572	22,314	.....	.9
Pine	69,277	15,116	3,600	50,561	1.9
Miscellaneous	194,160	30,028	41,981	122,151	5.3
Total	3,661,176	1,197,780	1,958,619	504,777	.....

Table 3 summarizes the reduction of the different kinds of wood by the three processes for 1906. Spruce occupies the leading place in both the mechanical and sulphite processes, but is relatively unimportant in the soda process. The proportion of spruce to the total amount of wood consumed shows a slight reduction. In 1905 it constituted 71 per cent of the total, while in 1906 it constituted 68½ per cent. Hemlock is doubtless largely responsible for the falling off in the relative consumption of spruce. Similarly, poplar shows a very slight reduction in the percentage consumed. In 1905 this species furnished 10 per cent of the total, while in 1906 it furnished 9 per cent. Hemlock, on the other hand, increased from 11 to over 14 per cent, and the miscellaneous item, which includes hardwoods, yellow pine, and most of the Pacific coast species, increased also.

Table 4 summarizes by States the quantity and value of wood used for pulp and the amount of pulp produced during the years 1905 and 1906.

TABLE 4.—*Wood used for pulp in 1905 and 1906.*

State.	1906		Average price per cord.[a]	Estimated quantity of pulp produced.	1905		Average price per cord.[b]	Estimated quantity of pulp produced.
	Amount.	Value.			Amount.	Value.		
	Cords.	*Dollars.*	*Dollars.*	*Tons.*	*Cords.*	*Dollars.*	*Dollars.*	*Tons.*
Maine	617,743	4,575,100	7.41	383,535	501,807	2,950,625	5.88	323,012
Massachusetts	33,302	262,030	7.87	18,086	34,362	171,810	5.00	16,995
Michigan	115,272	663,055	5.74	57,099	109,764	475,278	4.33	63,275
Minnesota	31,848	191,833	6.02	25,406	31,802	121,801	3.83	24,742
New Hampshire	319,729	2,364,270	7.39	174,543	233,700	1,257,306	5.38	128,898
New York	1,295,904	10,351,247	7.99	945,379	1,301,986	8,137,412	6.25	977,313
Ohio	34,723	189,011	5.44	16,868	54,000	274,320	5.08	29,050
Oregon	72,174	373,591	5.18	49,304	.....	.....	.....	.....
Pennsylvania	282,973	1,583,117	5.59	127,356	250,826	1,158,816	4.62	123,372
Vermont	34,968	290,384	8.30	38,403	22,271	122,490	5.50	20,207
Virginia	81,764	621,002	7.60	43,902	89,540	492,470	5.50	44,649
West Virginia	61,736	383,687	6.21	33,577	96,357	497,202	5.16	49,857
Wisconsin	542,354	3,708,540	6.84	338,997	382,471	1,686,697	4.41	240,657
Others	136,686	855,020	6.26	75,389	83,337	389,438	4.67	42,455
Total	3,661,176	26,411,887	7.21	2,327,844	3,192,223	17,735,665	5.56	2,084,482

[a] At mill. [b] At shipping point.

New York led in both 1905 and 1906. In 1906 Maine ranked second, Wisconsin third, New Hampshire fourth, and Pennsylvania fifth. In 1905, however, Pennsylvania ranked fourth and New Hampshire fifth, a reverse of the order of 1906.

The average price per cord of wood in 1906, $7.21, is much higher than in 1905, when it was $5.56. The difference is accounted for mainly by the fact that manufacturers were asked to report the value at point of shipment in 1905 and at the mill in 1906. The highest average price, $8.30 per cord, is credited to Vermont, followed by New York and Virginia, while the lowest price, $5.18 per cord, is in Oregon. The strong market for lumber of all kinds during the year doubtless helped to force up the price of pulpwood, but on the other hand it is well understood that most of the large tracts of pulpwood timber are rapidly passing into the control of large pulp producers, who in many instances are holding them in reserve for future supply and are purchasing for their present needs in the open market. This action necessarily withdraws from the present source of supply a considerable area which would otherwise form an important part of it. In order to secure their supply certain of the middle Western States have invaded the eastern market, and this doubtless strengthened it.

Table 5 shows the quantity of wood consumed by the mechanical and chemical processes for the years 1899, 1905, and 1906. It will be seen that the increase has been greater in the chemical process, and that more than twice as much wood is being reduced in this manner than by the mechanical process. In consideration of the very much smaller product obtained per cord of wood by the chemical process, the actual amounts of pulp produced each year by the two processes is doubtless about equal.

TABLE 5.—*Comparison of total amounts of wood used for pulp in 1899, 1905, and 1906.*

Process.	1899.	1905.	1906.	Increase.	
				1899 to 1905.	1905 to 1906.
	Cords.	*Cords.*	*Cords.*	*Per cent.*	*Per cent.*
Mechanical	786,840	1,096,804	1,197,780	39.4	9.2
Chemical	1,199,470	2,095,419	2,463,396	74.7	17.6
Total	1,986,310	3,192,223	3,661,176	60.7	14.7

EXPORTS AND IMPORTS.

All of the wood imported into the United States for the manufacture of pulp comes from Canada and is free from duty. The amount has increased from 369,217 cords in 1899 to 738,872 cords in 1906, as shown in Table 6. Since 1905 the imports have increased nearly 15 per cent. Only two kinds of wood are imported for pulp—spruce and poplar—and the quantity of poplar is very small. Imports of it, however, have fallen off nearly 25 per cent since 1905.

TABLE 6.—*Comparison of wood imported from Canada for pulp in 1899, 1905, and 1906.*

Kind.	1899.	1905.	1906.	Increase (+) or decrease (−).	
				1899 to 1905.	1905 to 1906.
	Cords.	*Cords.*	*Cords.*	*Per cent.*	*Per cent.*
Spruce	349,084	622,545	721,322	+78.3	+15.8
Poplar	20,133	22,883	17,550	+13.7	−23.3
Total	369,217	645,428	738,872	+74.8	+14.5

Table 7 shows the quantity and value of the imports of wood-pulp for the fiscal years 1902 to 1906, inclusive.

For the fiscal year ending June 30, 1906, the imports of wood-pulp amounted to 157,224 tons valued at $4,584,942. This amount is less by over 10,000 tons than the quantity imported during 1905, which indicates that a strong market is developing abroad for this product and that it is more profitable for Canadian manufacturers to market their product elsewhere than in the United States. Much the greater part of the imported wood-pulp comes from Canada.

TABLE 7.—*Wood-pulp imported, 1902–1906.*[a]

QUANTITY.

Country.	1902	1903	1904	1905	1906
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Europe	16,154	34,896	43,381	36,622	40,966
North America	51,262	81,985	101,415	130,882	116,258
Total	67,416	116,881	144,796	167,504	157,224

VALUE.

Country.	1902	1903	1904	1905	1906
	Dollars.	*Dollars.*	*Dollars.*	*Dollars.*	*Dollars*
Europe	736,574	1,520,747	1,786,097	1,820,412	2,081,580
North America	1,322,518	1,867,023	1,816,571	2,680,543	2,503,362
Total	2,059,092	3,387,770	3,602,668	4,500,955	4,584,942

[a] From annual report of the Bureau of Statistics of the Department of Commerce and Labor upon the commerce and navigation of the United States.

The quantity of wood imported for pulp in 1906, however, exceeds the quantity imported in 1905 by over 93,000 cords. Estimating an average yield of one-half ton of pulp per cord of wood, the quantity of pulp manufactured from this amount of imported wood is more than four times the loss in the imports of wood-pulp.

In 1906 Europe sent over 40,966 tons, or a little less than one-fourth of the total quantity of wood-pulp imported. In spite of the fact that wood-pulp is a dutiable commodity, an increased amount of it has been imported for the last five years. In fact, the total quantity has more than doubled during the time.

The exports of wood-pulp in 1906 amounted to 14,741 tons, which is an increase of 2,889 tons over 1905. The largest quantity exported in the last five years was during 1902, when over 19,000 tons were sent abroad. At the present time the United States is exporting six-tenths of 1 per cent, and importing 6.7 per cent of the estimated total consumption of wood-pulp.

TABLE 8.—*Wood-pulp exported, 1902–1906.*[a]

QUANTITY.

Country.	1902	1903	1904	1905	1906
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Europe	17,305	8,939	12,057	9,571	11,605
North America	1,307	1,721	2,024	1,720	2,605
South America	27	.....	110	61	84
Asia	500	382	625	207	325
Oceania	35	81	299	200	71
Africa	.....	109	.....	93	51
Total	19,174	11,232	15,115	11,852	14,741

VALUE.

Country.	1902	1903	1904	1905	1906
	Dollars.	*Dollars.*	*Dollars.*	*Dollars.*	*Dollars.*
Europe	661,011	356,339	478,682	386,533	468,856
North America	51,173	67,221	75,339	63,584	95,622
South America	1,375	.....	4,758	2,596	4,005
Asia	25,168	15,631	19,288	9,028	15,357
Oceania	1,376	3,245	15,366	8,964	2,843
Africa	.....	2,792	41	2,880	1,195
Total	740,103	445,228	593,474	473,585	587,878

[a] From annual report of the Bureau of Statistics of the Department of Commerce and Labor upon the commerce and navigation of the United States.

Of the wood-pulp imported into the United States, about equal quantities are manufactured by the mechanical and chemical processes, and while unmanufactured wood is admitted free of duty, mechanical pulp carries a duty of one-twelfth of a cent per pound, or approximately $1.66 a ton. The duty per ton on chemical pulp is higher than on mechanical. Unbleached chemical pulp carries a duty of one-sixth of a cent a pound, or about $3.33 per ton; bleached chemical pulp one-fourth of a cent a pound, or nearly $5 per ton. By far the greater part of the pulp imported comes in either as mechanical pulp or unbleached chemical pulp. Bleached chemical pulp, which carries the highest duty, constitutes less than one-fifth of the total amount. The average import value per ton of pulp manufactured by the mechanical process, as shown by the imports, is $14; unbleached chemical pulp, $34 per ton, and bleached chemical pulp, $50 per ton.

CONSUMPTION OF TANBARK AND TANNING EXTRACT IN 1906.

The consumption of tanbark in 1906 by 617 tanneries was 1,371,342 cords, valued at $12,774,071, which gave to each cord an average value of about $9.30. The principal kinds of bark used were hemlock and oak. Of the total amount about two-thirds was hemlock, while almost all the rest was oak, the quantity of chestnut and unclassified barks being relatively unimportant. The high value for the "All other" item is due to the fact that a large proportion of it is composed of imported barks and woods, the relative values of which are very high. In addition to bark, 658,777 barrels of extract were consumed. This extract was valued at $8,713,322. Both foreign and domestic extract is used. Of domestic extract—that is, extract manufactured from domestic woods and barks—chestnut extract constitutes the largest amount, being double the combined quantity of oak and hemlock extract. Quebracho, an imported wood extract, constituted by far the largest amount of any one kind, exceeding chestnut in quantity by about 10,000 barrels and in value by over $2,500,000. The very high percentage of tannin in this extract accounts for its extensive use and high value. The average price per barrel was highest for quebracho and lowest for chestnut. Quebracho had an average price of $18 per barrel; hemlock, $12.60 per barrel; oak, $9.90 per barrel, and chestnut $9.12 per barrel.

Table 1 summarizes the quantity and value of the tanning materials consumed in 1906. The cord of 2,000 pounds and the barrel of 500 pounds have been adopted as standards, and wherever the quantities are given in cords or barrels the number of pounds can be obtained by making the reduction on this basis.

TABLE 1.—*Quantity and value of tanning materials consumed in 1906.*

Kind.	Bark.		Extract.	
	Quantity.	Value.	Quantity.	Value.
	Cords.	*Dollars.*	*Barrels.*	*Dollars.*
Hemlock	931,152	7,902,393	68,811	846,726
Oak	406,493	4,416,659	60,384	598,299
Chestnut	22,668	168,527	257,069	2,346,884
Quebracho	.....	.....	267,016	4,817,012
Palmetto	.....	.....	1,191	14,887
All other	11,029	286,492	4,306	89,514
Total	1,371,342	12,774,071	658,777	8,713,322

TANBARK.

Although the tanning industry is widely distributed over the United States, the greater part of it is carried on in the States of Pennsylvania, New York, Michigan, and Wisconsin. This is shown by Table 2. More than two-thirds of all the bark consumed in 1906 was used in these four States, Pennsylvania using more than any other State. New York ranks second, Michigan third, and Wisconsin fourth. In all these States the consumption exceeds 100,000 cords per year, and they are the only States in which it passes this quantity. Of these four States, the highest average price per cord, $9.36, is in Pennsylvania. The average price in Wisconsin is $8.99; in New York, $7.99, and in Michigan, $7.77. The highest average price per cord of bark for any one State is found in Oregon, $26.66, California ranking next with $20.48. The bark used in the Pacific coast States is obtained chiefly from the tanbark oak of California, a different species from the eastern tanbark oak, which is chestnut oak. The high price of bark on the Pacific coast is due to the scarcity of oak in the West and to the fact that at present the wood of the tree is not fully utilized, but instead is often left in the woods. The lowest average price for bark is found in New Hampshire, at $6.81 per cord, and Vermont, at $7.17 per cord. The quantity of bark consumed in these States, however, is small, so these prices have little effect upon the average for the country. In the States east of the Mississippi River the highest price obtained for oak bark is $13.88 in New Jersey. The next highest prices are found in Indiana, Ohio, and Kentucky. The average price for the United States is $9.32.

TABLE 2.—*Consumption of tanbark, by States, in 1906.*

State.	Oak.			Hemlock.		
	Quantity.	Value.	Average value per cord.	Quantity.	Value.	Average value per cord.
	Cords.	*Dollars.*	*Dollars.*	*Cords.*	*Dollars.*	*Dollars.*
Alabama	1,270	10,235	8.06			
California	40,664	832,731	20.48			
Connecticut	105	945	9.00	650	4,550	7.00
Georgia	3,296	30,074	9.12			
Illinois	3	26	8.67	17,973	166,582	9.27
Indiana	1,885	22,095	11.72	400	4,625	11.56
Kentucky	12,809	125,413	9.79	350	4,025	11.50
Maine				14,870	113,195	7.61
Maryland	8,412	76,535	9.10	1,476	11,302	7.66
Massachusetts	2,782	31,454	11.31	80,778	669,610	8.29
Michigan				133,767	1,039,036	7.77
Minnesota				50	415	8.30
Missouri	1,930	22,196	11.50	1,695	19,380	11.43
New Hampshire				5,853	39,853	6.81
New Jersey	21,547	299,448	13.90	2,503	34,077	13.61
New York	96,328	711,415	7.39	184,319	1,529,872	8.30
North Carolina	42,211	375,711	8.90	655	5,335	8.15
Ohio	6,472	69,910	10.80	8,293	78,910	9.52
Oregon	17,020	473,600	27.83	1,232	12,932	10.50
Pennsylvania	46,542	426,454	9.16	308,715	2,751,878	8.91
Tennessee	29,179	253,914	8.70	2,565	18,740	7.31
Vermont				8,990	64,473	7.17
Virginia	62,114	552,442	8.89	7,025	60,121	8.56
West Virginia	11,748	95,721	8.15	37,303	269,718	7.23
Wisconsin				111,290	1,000,764	8.99
All others	176	6,340	36.02	400	3,000	7.50
Total	406,493	4,416,659	10.87	931,152	7,902,393	8.49

TABLE 2.—*Consumption of tanbark, by States, in 1906*—Continued.

State.	Chestnut.			All others.			Total.		
	Quantity.	Value.	Average value per cord.	Quantity.	Value.	Average value per cord.	Quantity.	Value.	Average value per cord.
	Cords.	*Dolls.*	*Dolls.*	*Cords.*	*Dolls.*	*Dolls.*	*Cords.*	*Dolls.*	*Dolls.*
Alabama							1,270	10,235	8.06
California							40,664	832,731	20.48
Connecticut							755	5,495	7.28
Georgia	147	977	6.65				3,443	31,051	9.02
Illinois	10	85	8.50				17,986	166,693	9.27
Indiana	1,200	13,300	11.08				3,485	40,020	11.48
Kentucky							13,159	129,438	9.84
Maine							14,870	113,195	7.61
Maryland							9,888	87,837	8.88
Massachusetts	3,744	28,080	7.50				87,304	729,144	8.35
Michigan							133,767	1,039,036	7.77
Minnesota							50	415	8.30
Missouri	675	7,088	10.50				4,300	48,664	11.32
New Hampshire							5,853	39,853	6.81
New Jersey	436	6,231	14.29				24,486	339,756	13.88
New York							280,647	2,241,287	7.99
North Carolina	55	398	7.24				42,921	381,444	8.89
Ohio	4,715	49,410	10.48				19,480	198,230	10.18
Oregon							18,252	486,532	26.66
Pennsylvania	8,241	41,926	5.09	11,029	286,492	25.98	374,527	3,506,750	9.36
Tennessee	53	268	5.06				31,797	272,922	8.58
Vermont							8,990	64,473	7.17
Virginia	1,869	16,847	9.01				71,008	629,410	8.86
West Virginia	1,523	3,917	2.57				50,574	369,356	7.30
Wisconsin							111,290	1,000,764	8.99
All others							576	9,340	16.22
Total	22,668	168,527	7.43	11,029	286,492	25.98	1,371,342	12,774,671	9.32

The quantity of hemlock bark used is more than double that of oak bark. About one-third of it is consumed in the State of Pennsylvania; New York ranks second, Michigan third, and Wisconsin fourth. The highest average price per cord, $13.61, is obtained in New Jersey, while the average price for hemlock bark in the United States is $8.49. It is interesting to note that the bark of the western hemlock is now used for tanning; a short time ago none of this bark was utilized. Oregon reports a consumption of 1,232 cords of hemlock bark, which is unquestionably that of the western hemlock. The value is given as $10.50 per cord. It is a well-known fact that the price of hemlock bark has not advanced as fast as might be expected in spite of the fact that the prices of other tanning materials and lumber have risen rapidly. This may be due to several causes—first, that the production of hemlock lumber, which is accompanied by the production of bark in nearly every State, is still on the increase in the leading States; secondly, the use of extracts, principally quebracho and other imported materials, has tended to make a smaller demand for hemlock bark than would otherwise be the case.

The quantity of chestnut bark consumed is relatively unimportant, amounting to less than 23,000 cords. Pennsylvania, Ohio, and Massachusetts lead in the consumption of this bark. The highest price paid was in New Jersey, $14.29. It will be noticed that the average price is lower than that of either hemlock or oak bark. Under "All

others" items there is about 11,000 cords of tanning materials. This consists chiefly of imported materials. They represent in large part the material used by progressive tanners as substitutes for native barks. The high average value shows that they are very rich in tannin; otherwise their use would be unprofitable as compared with native woods at a much lower price.

TANNING EXTRACT.

The use of tanning extract is rapidly growing. In 1900 the amount reported was 64,043 barrels. By 1906 the consumption of extract had increased until its total value was over two-thirds of the value of the tanbark used. This indicates the extent to which extract is supplementing the use of tanbark.

All told, extracts of four kinds are distinguished—oak, hemlock, quebracho, and palmetto. Of these, three are native and one imported. All are products of the forest, although palmetto extract is obtained from the roots rather than from the bark or wood of a tree. In the consumption of oak bark extract Kentucky leads, followed by Ohio, Massachusetts, New Jersey, and Pennsylvania. The average price per barrel is highest in California and lowest in North Carolina. In the consumption of hemlock bark extract, Pennsylvania leads; also in the consumption of bark. More than half of all the hemlock bark extract consumed was used in the State of Pennsylvania; Massachusetts ranks second; New York third.

TABLE 3.—*Consumption of tanning extract, by States, in 1906.*

State.	Oak.			Hemlock.		
	Quantity.	Value.	Average value per barrel.	Quantity.	Value.	Average value per barrel.
	Barrels.	*Dollars.*	*Dollars.*	*Barrels.*	*Dollars.*	*Dollars.*
California	2,781	55,544	19.97			
Connecticut	1,378	15,537	11.28	484	6,660	13.76
Delaware	40	513	12.83	36	540	15.00
Georgia	382	4,659	12.20	5	50	10.00
Illinois	340	3,175	9.34	304	4,180	13.75
Indiana	260	2,600	10.00	1,731	21,701	12.54
Kentucky	20,083	168,171	8.37	87	1,250	14.37
Maine	1,600	20,000	12.50			
Massachusetts	7,011	77,328	11.03	8,805	116,608	13.24
Michigan	1,732	14,794	8.54	2,296	29,488	12.84
Minnesota	1	10	10.00	70	962	13.74
Missouri	218	2,177	9.99	25	524	20.96
New Hampshire				700	8,750	12.50
New Jersey	6,320	71,435	11.30	150	1,500	10.00
New York	214	2,524	11.79	3,472	41,550	11.97
North Carolina	200	1,600	8.00	6	150	25.00
Ohio	13,429	115,243	8.58	1,078	15,280	14.17
Pennsylvania	3,328	32,422	9.74	48,736	586,874	12.04
Tennessee	1	20	20.00	135	1,586	11.75
Texas	80	1,000	12.50	20	200	10.00
Vermont	40	700	17.50	182	2,209	12.14
West Virginia	222	2,024	9.12			
Wisconsin	685	6,220	9.08	489	6,664	13.63
All other	39	603	15.46			
Total	60,384	598,299	9.91	68,811	846,726	12.31

TABLE 3.—*Consumption of tanning extract, by States, in 1906*—Continued.

State.	Chestnut.			Quebracho.		
	Quantity.	Value.	Average value per barrel.	Quantity.	Value.	Average value per barrel.
	Barrels.	*Dollars.*	*Dollars.*	*Barrels.*	*Dollars.*	*Dollars.*
Alabama	10,620	79,650	7.50	807	19,396	24.03
California	335	6,376	19.03	606	15,485	25.55
Connecticut				59	998	16.92
Delaware	59	649	11.00	29	713	24.59
Georgia	3,301	31,485	9.54	3,271	78,003	23.85
Illinois	2,105	16,845	8.00	5,026	95,527	19.01
Indiana				820	17,050	20.79
Kentucky	3,298	28,238	8.57	3,309	59,065	17.85
Maine	6,000	60,000	10.00	535	10,025	18.74
Maryland	1,189	11,194	9.41	818	16,824	20.57
Massachusetts	15,713	112,114	7.14	15,904	311,899	19.61
Michigan	25,975	202,775	7.81	7,940	166,272	20.94
Minnesota				100	2,375	23.75
Missouri	1,140	10,605	9.30	2,425	52,315	21.57
New Hampshire				255	4,694	18.41
New Jersey	4,242	42,380	9.99	12,857	214,331	16.67
New York	37,248	370,100	9.94	32,852	507,799	15.47
North Carolina	8,604	71,551	8.32	286	5,955	20.82
Ohio	2,123	21,418	10.09	5,205	111,330	21.39
Oregon				63	1,590	25.24
Pennsylvania	109,944	1,065,368	9.69	160,549	2,888,833	17.99
Tennessee	4,868	38,181	7.85	200	4,325	21.63
Texas				268	6,070	22.65
Vermont				320	4,200	13.13
Virginia	13,245	102,186	7.72	475	9,497	19.99
West Virginia	4,101	40,010	9.76	503	9,972	19.83
Wisconsin	2,959	35,759	12.08	11,491	201,492	17.53
All other				43	977	22.72
Total	257,069	2,346,884	9.13	267,016	4,817,012	18.04

State.	Palmetto.			All other.			Total quantity.	Total value.	Average value per barrel.
	Quantity.	Value.	Average value per barrel.	Quantity.	Value.	Average value per barrel.			
	Bbls.	*Dolls.*	*Dollars.*	*Bbls.*	*Dolls.*	*Dollars.*	*Bbls.*	*Dollars.*	*Dollars.*
Alabama							11,427	99,046	8.67
California				60	1,500	25.00	3,782	78,905	20.86
Connecticut	10	139	13.90	50	1,031	20.62	1,981	24,365	12.30
Delaware	1	15	15.00	426	8,319	19.53	591	10,749	18.19
Georgia							6,959	114,197	16.41
Illinois							7,775	119,727	15.40
Indiana				204	4,590	22.50	3,015	45,941	15.24
Kentucky							26,777	256,724	9.58
Maine							8,135	90,025	11.06
Maryland				60	870	14.50	2,067	28,888	13.98
Massachusetts	1	13	13.00	718	16,459	22.92	48,152	634,421	13.18
Michigan							37,943	413,329	10.89
Minnesota							171	3,347	19.57
Missouri							3,808	65,621	17.23
New Hampshire				392	5,099	13.01	1,347	18,543	13.77
New Jersey	1	14	14.00				23,570	329,660	13.99
New York	90	1,112	12.36	717	16,306	22.74	74,593	939,391	12.59
North Carolina							9,096	79,256	8.71
Ohio	10	200	20.00	90	1,777	19.74	21,935	265,248	12.09
Oregon							63	1,590	25.24
Pennsylvania	149	1,828	12.27	1,212	25,533	21.06	323,918	4,600,858	14.20
Tennessee							5,204	44,112	8.48
Texas				100	2,438	24.38	468	9,708	20.74
Vermont							542	7,109	13.12
Virginia							13,720	111,683	8.14
West Virginia							4,826	52,006	10.78
Wisconsin	929	11,566	12.45	277	5,592	20.19	16,830	267,293	15.88
All other							82	1,580	19.27
Total	1,191	14,887	12.48	4,306	89,514	20.79	658,777	8,713,322	13.22

An extract which is made from both the bark and wood of the chestnut tree is coming into general use, being second only to quebracho in quantity and value. Over 257,000 barrels of chestnut extract were consumed in 1906, and nearly one-half of the total amount was used in the State of Pennsylvania, followed by New York, Michigan, and Massachusetts. These four States consumed by far the greater part of this extract, although both Virginia and Alabama used considerable quantities.

IMPORTS.

The introduction of quebracho extract into the United States as a tanning material is of recent date, and the subsequent increase in its use has been little less than phenomenal. The quantity imported up to the time of the Twelfth Census was comparatively small, and at that time the total value of all the quebracho used in the United States amounted to but $292,133. In 1906 the value of the total quantity used amounted to $4,817,012, and the quantity to over 267,000 barrels. In its consumption of quebracho Pennsylvania ranks first, using more than one-half of the total, followed by New York, Massachusetts, New Jersey, and Wisconsin. The average price per barrel was $18, which, as it will be seen, is much higher than that of either hemlock, oak, or chestnut extract. Palmetto, the roots of which alone are used for tanning, is also shown separately in Table 3. The quantity is very small compared to the total amount, and is therefore relatively unimportant. Under the "All other" items are included a variety of extracts, among which the most important are sumach, gambier, and cutch.

Table 4 summarizes the tanning material imported for the fiscal year 1906. The information is taken from the Annual Report of the Bureau of Statistics of the Department of Commerce and Labor upon the Commerce and Navigation of the United States. Three different materials are distinguished—hemlock bark, mangrove bark, and quebracho. Of these, quebracho is by far the most important, the quantity of mangrove and hemlock bark being relatively unimportant. It will be noticed that quebracho is imported in two distinct forms—as a wood, shown in the first part of the table, the total quantity of which is 87,838 tons, and as an extract, the quantity amounting to 87,980 barrels. In the unmanufactured form—that is, wood—quebracho is admitted free of duty, but after it has been reduced to an extract and is in liquid form, it is subject to duty of one-half cent per pound; consequently a very large part of it comes in unmanufactured. It will be seen that the value of quebracho imported duty free is approximately the same as that which pays duty.

TABLE 4.—*Tanning material imported, 1906.*

Kind.		Quantity.	Value.
Bark and wood:			
Hemlock bark	cords	7,487	$35,861
Mangrove bark	tons	5,657	126,278
Quebracho wood	do	87,838	1,198,537
All other			101,193
Extract:			
Quebracho	barrels	87,980	1,194,949
All other	do	798	7,875
Total			2,664,693

CONSUMPTION OF POLES IN 1906.

The information in this circular concerning the consumption of poles during 1906 is based upon the number of poles purchased rather than the actual number produced during the year. It seems safe to assume, however, that the two were practically identical. Inquiries were sent out to more than 6,000 companies operating telegraph and telephone lines, electric light and power systems, trolley and street railway lines, and to railroad companies which operate their own telegraph or telephone lines. Practically all replied. The number of poles purchased during the year, as shown by these statistics, was 3,574,666, valued at $9,471,171 at the point of purchase. These figures do not include poles less than 20 feet long. Shorter poles are used for local lines and for temporary work, but they constitute only a small percentage of the total.

WOODS USED.

Table 1 shows, by kinds of woods, the quantity and value of round and sawed poles purchased in 1906. In both classes cedar ranks first and chestnut second. These two together furnish nearly nine-tenths of all the poles used, cedar supplying about three-fifths and chestnut over one-fourth.

TABLE 1.—*Number and value of round and sawed poles purchased in 1906.*

Kind.	Total.			Round poles.			Sawed poles.		
	Quantity.	Value at point of purchase.	Average value per pole.	Quantity.	Value at point of purchase.	Average value per pole.	Quantity.	Value at point of purchase.	Average value per pole.
	Number.	*Dollars.*	*Dollars.*	*Number.*	*Dollars.*	*Dollars.*	*Number*	*Dollars.*	*Dollars.*
Cedar	2,174,279	5,579,891	2.57	2,169,869	5,571,312	2.57	4,410	8,579	1.95
Chestnut	988,084	2,625,568	2.66	987,303	2,619,314	2.65	781	6,254	8.00
Pine	177,809	686,803	3.86	162,601	590,736	3.63	15,208	96,067	6.32
Cypress	111,657	256,950	2.30	111,292	255,867	2.30	365	1,083	2.97
Juniper	57,064	163,437	2.86	57,064	163,437	2.86	.....	.....	.....
Redwood	24,760	87,189	3.56	480	3,253	6.78	24,280	83,936	3.46
Oak	9,924	13,951	1.41	8,624	10,831	1.26	1,300	3,120	2.40
Fir	9,601	21,637	2.25	8,741	19,915	2.28	860	1,722	2.00
All other	21,488	35,745	1.68	20,901	35,025	1.68	587	720	1.23
Total	3,574,666	9,471,171	2.65	3,526,875	9,269,690	2.63	47,791	201,481	4.22

In average value per pole at the point of purchase, pine stands highest. This is due not to greater intrinsic value of the wood, but

to the greater proportion of large pine poles as compared with other kinds. Oak shows the lowest average value. The average price per pole for all kinds of timber in the United States was $2.65. Round poles brought an average of $2.63 and sawed poles $4.22 each. The higher cost of the sawed product is due chiefly to the additional labor and material necessary in their manufacture.

Cedar and chestnut are the principal trees cut for round poles; pine and redwood the chief ones sawed. Redwood is seldom found small enough to use for round poles. The sapwood of pine decays rapidly; consequently a sawed pine pole from which the sapwood has been removed will last longer than a round one. The average per pole values of the different kinds of wood are interesting in a general way, but can not be used for exact comparisons because the different sizes of poles are not distinguished. The explanation for the apparently unreasonable discrepancy between the values of round and sawed cedar poles is found in the fact that all the sawed cedar poles are of small sizes.

SIZES USED.

Table 2 shows the quantity and value of the different kinds of poles, classified by length. It was found impracticable to attempt a classification by both length and top diameter, because complicated tables would have resulted. The first class covers all poles from 20 to 25 feet long, inclusive; the second those from 26 to 30, inclusive; the third those from 31 to 35, and so on. The last class presented embraces all poles 41 feet or more in length.

TABLE 2.—*Length of poles purchased in 1906.*

CEDAR.

Length.	Round.			Sawed.		
	Number.	Value at point of purchase.	Average value.	Number.	Value at point of purchase.	Average value.
Feet.						
25	1,305,148	$1,558,025	$1.19	3,616	$5,387	$1.49
30	408,139	1,316,049	3.22	686	2,296	3.35
35	262,739	1,296,874	4.94	77	589	7.65
40	123,391	760,960	6.17	31	307	9.90
45	70,452	639,404	9.08	.....	.....	.....
Total	2,169,869	5,571,312	2.57	4,410	8,579	1.95

CHESTNUT.

25	404,877	$575,436	$1.42	3	$14	$4.67
30	265,315	668,602	2.52	339	2,025	5.97
35	184,028	616,277	3.35	155	890	5.74
40	75,108	348,684	4.64	135	969	7.18
45	57,975	410,315	7.08	149	2,356	15.81
Total	987,303	2,619,314	2.65	781	6,254	8.01

TABLE 2.—*Length of poles purchased in 1906*—Continued.

CYPRESS.

Length.	Round.			Sawed.		
	Number.	Value at point of purchase.	Average value.	Number.	Value at point of purchase.	Average value.
Feet.						
25	27,041	$29,554	$1.09	97	$254	$2.62
30	40,263	49,929	1.24	258	799	3.10
35	22,700	68,934	3.04	3	9	3.00
40	14,101	62,346	4.42	5	14	2.80
45	7,187	45,104	6.28	2	7	3.50
Total	111,292	255,867	2.30	365	1,083	2.97

JUNIPER.

25	24,063	$39,025	$1.62			
30	12,003	32,421	2.70			
35	10,638	39,182	3.68			
40	4,113	16,804	4.09			
45	6,247	36,005	5.76			
Total	57,064	163,437	2.86			

PINE.

25	77,730	$130,702	$1.68	4,650	$13,127	$2.82
30	30,520	96,907	3.18	4,496	29,826	6.63
35	25,914	125,396	4.84	4,547	32,959	7.23
40	15,828	81,205	5.13	964	9,208	9.55
45	12,609	156,526	12.41	551	10,947	19.87
Total	162,601	590,736	3.63	15,208	96,067	6.32

OAK.

25	7,748	$8,995	$1.16	1,300	$3,120	$2.40
30	807	1,701	2.11			
35	35	52	1.49			
40						
45	34	83	2.44			
Total	8,624	10,831	1.26	1,300	3,120	2.40

FIR.

25	1,418	$2,118	$1.49	800	$1,610	$2.01
30	5,502	12,716	2.31	30	52	1.73
35	1,552	4,228	2.72	30	60	2.00
40	194	553	2.85			
45	75	300	4.00			
Total	8,741	19,915	2.28	860	1,722	2.00

REDWOOD.

25				19,181	$52,514	$2.74
30	470	$3,145	$6.69	4,431	24,410	5.51
35				179	1,668	9.32
40	6	66	11.00	350	3,646	10.42
45	4	42	10.50	139	1,698	12.22
Total	480	3,253	6.78	24,280	83,936	3.46

TABLE 2.—*Length of poles purchased in 1906*—Continued.

ALL OTHER.

Length.	Round.			Sawed.		
	Number.	Value at point of purchase.	Average value.	Number	Value at point of purchase.	Average value.
Feet.						
25	14,369	$17,923	$1.25	511	$384	$0.75
30	3,454	7,967	2.31	33	102	3.09
35	1,913	3,487	1.82	43	234	5.44
40	843	3,394	4.03	.....	.....	.....
45	322	2,254	7.00	.....	.....	.....
Total	20,901	35,025	1.68	587	720	1.23

TOTAL.

25	1,862,394	$2,361,778	$1.27	30,158	$76,410	$2.53
30	766,473	2,189,437	2.86	10,273	59,510	5.79
35	509,519	2,154,430	4.23	5,034	36,409	7.23
40	233,584	1,274,012	5.45	1,485	14,144	9.52
45	154,905	1,290,033	8.33	841	15,008	17.85
Total	3,526,875	9,269,690	2.69	47,791	201,481	4.22

The shortest or 25-foot class takes in three-fourths of the redwood poles, three-fifths of the cedar, one-half of the chestnut, and two-fifths of the juniper. With cypress the quantities are more evenly distributed among the 25, 30, and 35 foot sizes.

The price of the poles at the point of purchase is the basis on which their value was determined. In theory this price might be supposed to represent the spot value of the poles at the nearest point of shipment. In practice, however, this is not always the case. For example, one consumer may purchase directly from the producer, and the cost of poles at the point of purchase is then the spot value, while another company operating in the same territory as the first may deal with a local middleman, in which case the cost at the point of purchase includes transportation charges. This condition is, at least partly, the cause of the differences between the values per pole of different woods in the same size class as shown in Table 2. The smallest size class of cedar pole, for example, shows a lower average value than the corresponding pine and chestnut poles—that is, cedar poles are oftener purchased at the point of production than are pine or chestnut. There is a possibility also that within this class size there are more short cedar poles than is the case with the other woods.

NUMBER OF POLES USED BY VARIOUS KINDS OF ELECTRICAL COMPANIES.

Table 3 shows the kind, quantity, and value of the poles bought by the four principal classes of consumers—telegraph and telephone companies, steam railroad companies, street railway companies, and electric light and power companies. The street railways are grouped

with the electric light and power companies, because not infrequently one company serves in a double capacity and separation was impossible.

TABLE 3.—*Poles purchased by various classes of consumers in 1906.*

Kind.	Total.			Telephone and telegraph companies.		
	Quantity.	Value at point of purchase.	Average value per pole.	Quantity.	Value at point of purchase.	Average value per pole.
	Number.	*Dollars.*	*Dollars.*	*Number.*	*Dollars.*	*Dollars.*
Cedar	2,174,279	5,579,891	2.57	1,532,906	3,079,852	2.01
Chestnut	988,084	2,625,568	2.66	661,898	1,510,484	2.28
Cypress	111,657	256,950	2.30	21,395	36,559	1.71
Juniper	57,064	163,437	2.86	38,331	91,854	2.40
Pine	177,809	686,803	3.86	121,609	478,427	3.93
Oak	9,924	13,951	1.41	2,980	1,500	.50
Fir	9,601	21,637	2.25	9	94	10.44
Redwood	24,760	87,189	3.56	7,140	24,390	3.42
All other	21,488	35,745	1.68	9,454	11,789	1.25
Total	3,574,666	9,471,171	2.65	2,395,722	5,234,949	2.19

Kind.	Steam railroad companies.			Street railroads, electric light and power companies.		
	Quantity.	Value at point of purchase.	Average value per pole.	Quantity.	Value at point of purchase.	Average value per pole.
	Number.	*Dollars.*	*Dollars.*	*Number.*	*Dollars.*	*Dollars.*
Cedar	144,359	371,246	2.57	497,014	2,128,793	4.28
Chestnut	63,151	139,579	2.21	263,035	975,505	3.71
Cypress	11,976	20,271	1.69	78,286	200,120	2.56
Juniper	465	638	1.37	18,268	70,945	3.88
Pine	16,826	22,866	1.36	39,374	185,510	4.71
Oak	2,736	2,549	.92	4,208	9,902	2.35
Fir	1,284	2,533	1.97	8,308	19,010	2.29
Redwood	9,871	21,920	2.22	7,749	40,879	5.28
All other	3,600	4,225	1.17	8,434	19,731	2.34
Total	254,268	585,827	2.30	924,676	3,650,395	3.95

The telegraph and telephone companies purchased about two-thirds of the total number reported and the street railway, light, and power companies about one-fourth. The remainder is credited to railroad companies which own and operate their own telegraph or telephone lines.

SUPPLY.

The regions of supply of the two principal pole timbers—cedar and chestnut—are fairly well defined and are, unfortunately, extremely limited. The present source of supply of cedar poles in the United States is confined almost entirely to the Lake States. The total purchase of cedar poles reported for the United States in 1906 was 2,174,279. The production of the Northwestern Cedarman's Association, which operates in the Lake States, as shown by the association statistics, was more than 1,700,000. The greater part of the produc-

tion outside the Lake States can be credited to two sources—Maine and the adjoining States, including the Adirondacks in New York, and the Idaho cedar territory. From these districts cedar poles are shipped to practically every State in the Union.

The regions from which the supply of chestnut poles is drawn are even narrower. A small territory—embracing parts of Pennsylvania, Maryland, Virginia, and West Virginia—furnishes nearly all of these poles. Cypress poles necessarily come from the South, probably the greater part from the Gulf States; juniper, from Virginia, the Carolinas, and other South Atlantic States. Redwood comes wholly from California.

With the regions of supply so restricted, transportation becomes an important factor. The cost of the pole is sometimes doubled by freight charges. This difficulty is obviated, in a measure, by the use of local woods, cypress and pine in the Southern States, for instance, and chestnut and juniper in the Atlantic States. On the Pacific coast cedar is supplemented to a considerable extent by pine and redwood. But such local supplies are insufficient, and cedar and pine are found everywhere.

There are no data available which show even approximately the quantity of cedar still standing in this country or Canada to meet the enormous demand of 2,000,000 poles each year. It is certain, however, that when the present supply is exhausted it will be gone forever, since the cedar, though it reproduces fairly well, grows so slowly that other kinds of trees, chestnut for instance, will be more profitable to produce by systematic management.

SUITABILITY OF VARIOUS WOODS.

There are several qualities which timber must possess to adapt it to use for poles. The most important of these are: Durability in contact with the soil, minimum weight, straightness coupled with relatively small size, and little taper. The wood must be soft, so that the spikes of a climber may enter readily, and at the same time it must have strength to support considerable weight. These qualities are admirably combined in cedar and in juniper, which commercially is a cedar. No other woods possess so many.

Chestnut and cypress are both durable; chestnut is not so straight as cedar and is liable to be knotty. The wood, though soft, is not as soft as cedar. It has greater strength, but this advantage is more than counterbalanced by its greater weight, which prohibits long shipments. Cypress frequently is too large for use as a pole and has greater value for lumber. Even when its general diameter is small enough the butt will often be so big that it adds too much weight. Pine, besides being heavier than cedar, is so much less durable that

it can not compete as a pole wood without preservative treatment. Redwood possesses durability, lightness, and softness, but its size necessitates sawing, which adds to the cost.

PRESERVATIVE TREATMENT.

One of the results of the increased cost of poles and the difficulty of obtaining a sufficient quantity of satisfactory stock has been an effort to increase the period of service of poles by preservatives, generally by applying a liquid to the whole of the pole or, more generally, to the butt, which is most liable to decay. Poles which have not been treated with preservatives may be expected to give from ten to fifteen years of service, roughly speaking.

Creosote is probably more extensively used than any other preservative, though ordinary paint is a common agent. For the butt tar is often employed, and charring by fire is found useful. The American Telephone and Telegraph Company is carrying on extensive experiments in cooperation with the Forest Service to determine the best methods and materials. Several experimental lines of variously treated poles have been erected and careful records of the behavior of each pole is being kept. By the comparatively new open-tank treatment the preservative is forced into the wood of the butt by a much simpler and more inexpensive method than was formerly used.[a]

Successful preservatives make possible the use for poles of a great number of otherwise unsuitable timbers, many of them among the cheaper and more abundant woods.

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[a] Forest Service Circular 104: Brush and Tank Pole Treatments.

WOOD USED FOR DISTILLATION IN 1906.

Since the distillation of wood is divided into two distinct branches, the distillation of hardwoods and the distillation of softwoods, each branch of the industry is dealt with separately in this circular.

HARDWOOD DISTILLATION.

The statistics of hardwood distillation are based upon reports received from 86 plants, while those for 1905 [a] were the result of reports from 67 plants. This does not mean that there has been a large increase in the number of plants in operation, since the statistics for 1905 did not cover the field completely. For this reason no comparison of the production of the two years has been attempted.

Table 1 shows the quantity and value of the hardwood used for destructive distillation in 1906. The unit of measure is the cord of 128 cubic feet of rough wood. It is impracticable to separate the body wood and limb wood or show the exact quantities of each of the different hardwoods which are used. Beech, maple, and birch combined furnish practically all of the raw material used, although some oak and other hardwoods enter into the total.

TABLE 1.—*Wood used in hardwood distillation by States in 1906.*

State.	Number of plants.	Wood used.	Value.	Value per cord.
		Cords.	*Dollars.*	*Dollars.*
Michigan	12	541,119	1,626,750	3.01
New York	20	91,380	301,296	3.30
Pennsylvania	50	390,752	1,395,637	3.57
All others [b]	4	121,645	392,740	3.23
Total	86	1,144,896	3,716,423	3.25

[a] Forest Service Circular 50, Wood Used for Distillation in 1905.
[b] Missouri, Maine, and Wisconsin.

The average cost of wood is highest in Pennsylvania and lowest in Michigan. While both of these States are well supplied with raw material for this purpose—beech, birch, and maple—Pennsylvania, being an older and more thickly populated State, offers a readier market for wood, and the consequence is it brings a higher price.

Table 2 gives the quantity and value of products obtained from the distillation of hardwood. It will be seen that the value of the charcoal, alcohol, and acetate of lime produced are nearly equal.

TABLE 2.—*Products of hardwood distillation by States in 1906.*

State.	Charcoal.		Crude alchohol.		Gray acetate.		Brown acetate.		Tar and oils.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Bushels.[a]	*Dollars.*	*Gallons.*	*Dollars.*	*Pounds.*	*Dollars.*	*Pounds.*	*Dolls.*	*Galls.*	*Dolls.*
Michigan	21,688,170	1,366,538	2,956,739	998,939	15,064,508	300,916	3,172,670	31,245	150,000	15,000
New York	3,075,673	212,072	871,036	302,783	13,860,892	269,086	3,264,281	46,188	.....	.....
Pennsylvania	15,316,826	1,010,558	3,467,167	1,192,921	61,859,097	1,366,500	523,982	8,344	100,610	4,877
All others[b]	5,577,052	376,772	576,552	181,548	5,592,000	80,829	.....	.....	.....	.....
Total	45,657,721	2,965,940	7,871,494	2,676,191	96,376,497	2,017,331	6,960,933	85,777	250,610	19,877

[a] Bushel equivalent to 20 pounds. [b] Missouri, Maine, and Wisconsin.

Michigan, Pennsylvania, and New York are the principal States in the destructive distillation of hardwoods. Michigan leads both in quantity of wood used and in charcoal produced, while Pennsylvania ranks first in the production of crude wood alcohol and gray acetate of lime. (Tables 1 and 2.) This fact is the result of conditions under which the wood is carbonized, rather than any quality of the wood itself. Michigan uses most wood, but obtains from it a very low average yield of both acetate of lime and alcohol but a fairly large amount of charcoal. Wood alcohol and acetate are by-products that can be saved in their entirety only by the use of the most improved processes of distillation—that is, the use of air-tight retorts and the carbonization of the wood by indirect application of heat.

Charcoal, on the other hand, can be obtained in large quantity by almost any process of carbonization. At present in Michigan most of the wood is carbonized in kilns, in which it is placed and fired directly. Under these conditions 4 to 6 gallons of wood alcohol per cord and but a small proportion of acetate can be saved. The production of charcoal per cord, on the other hand, is maintained at nearly its maximum.

In Pennsylvania opposite conditions obtain, retort and oven plants being employed almost exclusively, so that the production of wood alcohol shows an average of 8 gallons per cord, and acetate 160 pounds. Charcoal, however, is practically the same as in Michigan.

Table 3 summarizes the figures given in Table 2 and, in addition, shows the average value per bushel, gallon, or pound of the products.

TABLE 3.—*Quantity and value of the products of hardwood distillation in 1906.*

Product.	Quantity.	Total value.	Average value.
Charcoal.....bushels..	45,657,721	$2,965,940	$0.06
Alcohol, crude.....gallons..	7,871,494	a2,676,191	.34
Acetate, gray.....pounds..	96,376,497	2,017,331	.02
Acetate, brown.....do....	6,960,983	85,777	.01
Tar and oil.....gallons..	250,610	19,877	.08
Total.....	.....	8,020,971	.....

a Estimated.

Of all products charcoal has the greatest total value, followed by wood alcohol, gray and brown acetate of lime, and tar and oil, in the order given. The average price obtained for crude wood alcohol in 1906 was 34 and a fraction cents per gallon. In New York charcoal brought the highest average price and in Missouri the lowest, though in no case did the price exceed 7 cents per bushel. All refined wood alcohol reported has been reduced to crude wood alcohol of 82 per cent test.

Calculations based on Tables 1 and 2 show that Michigan and Pennsylvania have an average production of charcoal per cord of wood of about 40 bushels. New York ranks lower than either Pennsylvania or Michigan, having an average production of less than 34 bushels per cord. In computing the number of bushels of charcoal, a standard of 20 pounds per bushel has been used.

PINE DISTILLATION.

While in hardwood distillation the chief products are wood alcohol, charcoal, and acetate of lime, in pine distillation they are turpentine, tar, and charcoal, though the last is comparatively unimportant. Operations at present are confined almost wholly to southern pines. The States of North Carolina, South Carolina, Georgia, Florida, and Alabama furnish practically all of the turpentine obtained in this manner. It is interesting to note, however, that operations have been started upon the Douglas fir of the Pacific coast and the Norway pine of the Lake States.

PROCESSES EMPLOYED.

It must be borne in mind that the figures given for the products of pine distillation are the results of a combination of products, obtained by two distinct processes of distillation, destructive distillation and

steam distillation. The former process is somewhat similar to the destructive distillation of hardwood, in that the wood is carbonized completely and the oils are driven off in this way. The chief products obtained are turpentine, tar, charcoal, and oils.

The other process is known as steam distillation. Briefly, it consists of reducing the wood to chips by mechanical means and cooking it with live steam. The products contained in the wood are distilled with the steam and come off readily. The wood, however, is not carbonized as in the other process.

The chief products of distillation by this process are turpentine and heavy oils. Turpentine produced in this manner is, when properly refined, about equal to gum turpentine and superior in some respects to turpentine obtained by destructive distillation of pine.

Table 4 shows the quantity and value of softwood distilled in 1906, as reported by 33 plants. The total amount used was 50,234 cords, valued at $129,358, or an average value of $2.58 per cord. The highest average price per cord, $3.03, was in North Carolina; the lowest average, $1.73, was in Florida.

TABLE 4.—*Wood used for pine distillation in 1906, by States.*

State.	Quantity.	Average value per cord.	Total value.
	Cords.		
Alabama	3,236	$2.81	$9,098
Florida	10,100	1.73	17,515
Georgia	14,986	2.51	37,661
North Carolina	16,332	3.03	49,564
South Carolina	2,972	2.64	7,837
All others[a]	2,608	2.95	7,683
Total	50,234	2.58	129,358

[a] Louisiana, Michigan, Minnesota, and Washington.

Table 5 shows the quantity and value of the products of pine distillation in 1906.

TABLE 5.—*Quantity and value of the products of pine distillation in 1906.*

Product.	Quantity.	Total value.	Average value.
Turpentine ..... gallons..	503,427	$238,612	$0.47
Tar ..... do....	648,120	64,368	.10
Charcoal ..... bushels..	791,887	44,381	.06
Oil of tar ..... gallons..	125,008	17,429	.14
Pyroligneous acid ..... do....	305,000	15,380	.05
Total	.....	380,170	.....

Table 6 itemizes, by States, the products of the distillation of pine.

TABLE 6.—*Products of pine distillation, by States, in 1906.*

State.	Turpentine.		Tar.		Charcoal.		Oil of tar.		Pyroligneous acid.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Gallons.	*Dollars.*	*Gallons.*	*Dollars.*	*Bushels.*[a]	*Dollars.*	*Galls.*	*Dollars.*	*Gallons.*	*Dollars.*
Alabama	43,360	20,106	150,000	10,500	80,000	8,000	.....	.....	200,000	10,000
Florida	97,600	49,570	257,600	30,912	112,500	6,750	.....	.....	.....	.....
Georgia	140,375	71,637	30,070	3,511	99,000	6,688	56,538	10,301	13,000	780
North Carolina	148,986	65,785	105,600	10,560	411,442	17,811	28,970	2,528	11,000	550
South Carolina	33,242	13,902	69,000	5,100	25,000	1,500	39,500	4,600	81,000	4,050
All others[b]	39,864	17,612	35,850	3,785	63,945	3,632	.....	.....	.....	.....
Total	503,427	238,612	648,120	64,368	791,887	44,381	125,008	17,429	305,000	15,380

[a] Bushel equivalent to 20 pounds. [b] Louisiana, Michigan, Minnesota, and Washington.

Florida leads in the production of tar and North Carolina in the production of turpentine. The extremely varying amounts shown in the average quantity of products obtained in the different States show clearly that distillation methods are not yet perfected and that considerable quantities of some of these products are not saved. The charcoal product is strikingly variable, because in destructive distillation charcoal is a product of importance, while the extraction of turpentine and other oils from pine wood by steam distillation does not carbonize the wood, so no charcoal is obtained.

Table 7 shows the quantity and value of wood alcohol exported from 1902 to 1906. The quantity exported nearly doubled from 1902 to 1904, while the average value decreased from 54 cents per gallon in 1902 to 49 cents per gallon in 1904. In 1905 there was an unimportant reduction in the amount exported, while the price increased from 49 cents to 55 cents. In 1906 the quantity exported shows a reduction of about one-third from 1905, and the price increased to approximately 60 cents per gallon.

TABLE 7.—*Quantity and value of wood alcohol exported, 1902–1906.*

Year.	Quantity.	Value.	Average value per gallon.
	Gallons.		
1902	626,925	$338,619	$0.54
1903	833,629	452,892	.54
1904	1,194,466	585,359	.49
1905	1,097,451	603,385	.55
1906	780,222	466,467	.598

PRODUCTION OF VENEER IN 1906.

INCREASE IN PRODUCTION.

In 1906 veneer manufacturers used more wood and made more veneer than in any previous year for which there has been a report. During the year 315 mills converted 329,186,000 board feet of timber, log scale, into approximately 2,068,094,000 square feet of veneer. Thus every board foot of timber, measured log scale, furnished about 6 square feet of veneer. Of the total product of the veneer industry nearly nine-tenths was rotary cut and the remainder was either sawed or sliced. The present greatly increased production of veneer is due to the growing use of thin sheets of wood for many purposes other than as true veneer. The term is not restricted as formerly to describe a finishing surface over a less costly base. It now includes also any and all thin sheets of wood that go into the production of such articles as boxes, baskets, and crates, and into the manufacture of laminated or "built-up" stock.

QUANTITY OF WOOD USED.

It should be borne in mind in comparing figures for 1905 and 1906 that the statistics compiled in 1905 were the results of the first attempt of this sort, and were admittedly incomplete, while those for 1906, compiled after the first year's experience, are believed to cover the industry. The figures for the consumption of each kind of wood, with the exception of yellow poplar, show an increase in 1906 over the statistics compiled in 1905. In 1906 the leading woods, in order of quantity used, were red gum, yellow pine, white oak, maple, cottonwood, yellow poplar, basswood, birch, elm, and tupelo. As in 1905 red gum led all other woods in quantity used, yellow pine took second place from maple, which dropped to fourth place, while white oak ranked third in place of yellow poplar, which went to sixth. The quantity of material used in 1906 exceeds that reported in 1905 by 148,040,000 board feet. The greatest gains were in red gum, 33,000,000 feet; yellow pine, 33,000,000 feet; white oak, 22,000,000 feet, and cottonwood, 13,000,000 feet.

Rotary-cut veneer is by far the most important product, though the quantity of sawed white oak veneer exceeds the rotary-cut white oak. This unique position of white oak is explained by the fact that oak cut into veneer is used chiefly in the manufacture of furniture. It is impossible to obtain a quartered-oak figure by cutting on a rotary machine, therefore the greater part of it is either sawed or sliced. Since red oak has a more open grain and is less desirable for furniture veneer the larger proportion of it is rotary cut. Woods,

such as red gum and yellow poplar, used for centers of built-up veneers are almost always cut on rotary machines. Yet it is often possible by cutting certain woods on the rotary machine to secure their most pleasing figure for outside finish on built-up veneers. This is true of bird's-eye maple and curly birch, in which the figures would not be retained effectively if they were sawed or sliced.

VALUE OF WOOD USED.

The highest average value per thousand feet, log scale, $67.76, is credited, as might be expected, to walnut, while white oak ranks second with $31.67, followed by red oak with $26.61. Of the more valuable finishing woods, maple and birch show the lowest figures, $12.02 for the former and $13 for the latter. The lowest average price of all species is for Douglas fir, which is $7. No values are shown in the 1905 statistics; therefore it is impossible to make comparisons of log values between 1905 and 1906.

PRODUCTION TABLES.

Table 1 shows in detail the quantity, value of the different kinds of timber used, and the product obtained in 1906, and the quantity of timber used and the veneer produced in 1905.

TABLE 1.—*Material used and quantity of veneer produced in 1905 and 1906, by kinds of wood.*

Kind.	1906.					1905.	
	Material used.		Average price per M.	Product.		Material used, log scale.	Product.
	Log scale.	Value.		Rotary cut.	Sawed or sliced.		
	M. feet.	*Dollars.*	*Dollars.*	*Sq. feet.*	*Sq. feet.*	*M. feet.*	*Sq. feet.*
Red gum	73,062	696,246	9.56	405,677	7,900	39,573	187,940
Yellow pine	45,581	361,799	8.01	153,832	28,422	12,688	41,069
White oak	38,848	1,232,077	31.67	117,432	128,076	16,129	115,265
Maple	30,084	365,171	12.02	302,527	6,860	26,246	179,809
Cottonwood	29,063	359,439	12.37	107,884	250	16,357	45,223
Yellow poplar	21,619	460,355	21.29	164,023	8,045	26,164	151,566
Basswood	15,659	248,063	15.84	72,158	1,285	11,376	82,925
Birch	16,823	185,732	13.00	136,794	451	12,643	128,521
Elm	12,122	165,502	13.81	91,148	1,275	5,544	60,708
Tupelo	8,311	74,954	9.02	41,755	.....	314	1,806
Red oak	8,109	215,610	26.61	46,377	14,660	4,955	31,054
Spruce	6,477	84,285	13.20	50,896	8,900	.....	.....
Beech	5,324	62,353	11.69	39,239	616	1,400	18,765
Ash	5,214	87,305	16.74	15,486	14,118	2,461	21,648
Walnut	5,121	347,021	67.76	65,046	2,138	1,725	21,181
Sycamore	4,530	42,613	9.41	17,965	117	576	1,435
Cherry	582	11,894	20.44	3,368	113	.....	.....
Hickory	568	6,220	10.95	3,366	.....	.....	.....
Douglas fir	370	2,590	7.00	2,600	.....	.....	.....
All others	1,719	29,316	13.83	5,245	2,050	2,995	19,603
Total	329,186	5,038,545	15.43	1,842,818	225,276	181,146	1,108,518

Table 2 gives in detail the quantity and value of timber used for veneer, by States, and the amount of stock produced in 1906. In quantity of wood used Illinois leads, followed in order by Tennessee, Michigan, Wisconsin, Florida, and Indiana. In value of wood used, however, the order is somewhat changed; Indiana is first, followed by Illinois, Wisconsin, Tennessee, Michigan, and New York. The highest average value per thousand feet was obtained in Massachusetts.

TABLE 2.—*Quantity and value of material used, and quantity of veneer produced in 1906, by States.*

State.	1906.				
	Log scale.	Value.	Average price per M feet.	Products.	
				Rotary.	Sawed or sliced.
	M board ft.	*Dollars.*	*Dollars.*	*M sq. ft.*	*M sq. ft.*
Alabama	8,026	76,573	9.54	35,316	1,500
Arkansas	4,378	41,361	9.45	15,350	.....
Delaware	4,125	54,300	13.16	22,170	5,000
Florida	26,209	180,383	6.99	95,090	6,560
Georgia	9,808	77,651	7.92	45,753	2,000
Illinois	40,267	754,211	18.82	321,836	21,696
Indiana	25,332	825,055	32.57	79,558	58,835
Indian Territory	327	2,518	7.70	1,460	.....
Kentucky	14,074	133,066	9.45	29,356	5,583
Louisiana	2,935	23,580	7.07	6,720	245
Maine	4,705	88,415	18.79	34,670	8,000
Maryland	9,340	222,634	23.84	33,250	31,100
Massachusetts	472	21,348	45.23	.....	7,105
Michigan	30,284	353,745	11.68	269,730	8,726
Mississippi	2,345	23,268	9.92	7,940	980
Missouri	15,069	190,940	12.67	92,355	100
New Jersey	851	24,975	29.35	4,067	.....
New York	10,850	237,202	21.86	73,277	3,325
North Carolina	12,666	156,994	12.39	72,843	10,102
Ohio	5,969	189,810	31.80	41,552	4,746
Oregon	4,661	41,058	8.79	20,750	.....
Pennsylvania	2,242	60,209	26.86	17,577	.....
South Carolina	4,578	42,213	9.22	16,005	.....
Tennessee	30,808	408,225	13.25	81,537	40,400
Texas	2,490	21,395	8.59	6,530	2,600
Vermont	3,579	44,276	12.37	49,449	.....
Virginia	10,191	142,530	13.99	64,967	2,000
Washington	6,873	62,385	9.21	53,451	2,850
West Virginia	3,572	79,851	22.05	51,027	.....
Wisconsin	32,160	458,374	15.39	198,572	1,823
Total	329,186	5,038,545	15.43	1,842,818	225,276

Table 3 shows, by States and species, the wood used in the manufacture of veneer in 1906.

TABLE 3.—*Material used for veneer stock, by States and species, 1906.*

[In M board feet.]

State.	Aggregate log scale.	Red gum.	Yellow pine.	White oak.	Maple.	Cottonwood.	Yellow poplar.
Alabama	8,026	4,173	352	250	50	3	248
Arkansas	4,378	1,640	1,175	10	.....	900	112
Delaware	4,125	1,993	400	50	175	.....	70
Florida	26,209	41	26,136	3	.....	.....	.....
Georgia	9,808	3,171	6,602	.....	2	10	18
Illinois	40,267	17,798	.....	3,211	545	10,290	1,665
Indiana	25,332	815	.....	19,443	605	55	1,274
Indian Territory	327	55	.....	42	.....	15	.....
Kentucky	14,074	9,789	.....	920	82	.....	932
Louisiana	2,935	350	180	.....	.....	1,800	80
Maine	4,705	.....	.....	.....	.....	.....	.....
Maryland	9,340	622	3,075	1,646	170	.....	1,446
Massachusetts	472	.....	.....	90	214	.....	164
Michigan	30,284	.....	.....	429	17,629	22	162
Mississippi	2,345	1,427	358	.....	.....	120	420
Missouri	15,069	8,860	.....	550	240	3,046	.....
New Jersey	851	2	.....	8	41	.....	546
New York	10,850	3	350	1,021	4,474	3	61
North Carolina	12,666	1,480	707	566	.....	.....	6,969
Ohio	5,969	20	.....	2,389	297	45	545
Oregon	4,661	.....	228	100	.....	2,122	.....
Pennsylvania	2,242	.....	.....	100	702	.....	13
South Carolina	4,578	183	2,768	.....	.....	.....	1,542
Tennessee	30,808	12,740	1,000	5,800	.....	6,500	1,513
Texas	2,490	330	1,960	200	.....	.....	.....
Vermont	3,579	.....	.....	.....	2,433	.....	.....
Virginia	10,191	6,550	225	625	.....	400	2,116
Washington	6,873	.....	.....	.....	.....	3,732	.....
West Virginia	3,572	1,000	.....	708	5	.....	1,723
Wisconsin	32,160	20	65	687	2,420	.....	.....
Total	329,186	73,062	45,581	38,848	30,084	29,063	21,619

TABLE 3.—*Material used for veneer stock, by States and species, 1906*—Continued.

State.	Basswood.	Birch.	Elm.	Tupelo.	Red oak.	Spruce.	Beech.
Alabama			50	2,323	17		
Arkansas	260		252		10		
Delaware		320	50	1,017	50		
Florida			4		1		
Georgia				2			
Illinois	1	151	526	1,505	335		
Indiana	150	25	225		1,155		90
Indian Territory					215		
Kentucky	24		400		75		1
Louisiana				200			
Maine	1,505	1,200				1,500	
Maryland		60	20	244	1,036		50
Massachusetts							
Michigan	2,699	1,031	4,245		447		2,756
Mississippi				20			
Missouri	200		879		443		
New Jersey	152						
New York	1,132	789	777		228		859
North Carolina				2,925	10		
Ohio	146		398		141	16	461
Oregon						1,820	
Pennsylvania	136	13	250		58		707
South Carolina				75			
Tennessee	100		75		1,000		
Texas							
Vermont	25	696	20				400
Virginia	50				142		
Washington						3,141	
West Virginia	100				18		
Wisconsin	8,979	12,538	3,951		2,728		
Total	15,659	16,823	12,122	8,311	8,109	6,477	5,324

State.	Ash.	Walnut.	Sycamore.	Cherry.	Hickory.	Douglas fir.	All others.
Alabama	10		50		300		
Arkansas	4						15
Delaware							
Florida	1				3		20
Georgia							3
Illinois	226	2,329	1,625				60
Indiana	225	1,115	15		50		90
Indian Territory							
Kentucky	41	23	1,784	3			
Louisiana							325
Maine							500
Maryland	415	400	156				
Massachusetts		4					
Michigan	608	3	204	33	14		2
Mississippi							
Missouri	147		631				73
New Jersey	1	1					100
New York	443	35	10	538	1		126
North Carolina			9				
Ohio	297	1,175	39				
Oregon						370	21
Pennsylvania	3			8			252
South Carolina	10						
Tennessee	2,000						80
Texas							
Vermont	5						
Virginia	11	18	7				47
Washington							
West Virginia		18					
Wisconsin	767						5
Total	5,214	5,121	4,530	582	568	370	1,719

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